

The Search for a Reasonable Balance: Managing of Protected Mountain Areas for Sustainable Development

Sir Arthur Norman, KBE, DFC

CHAPTER II

PEOPLE AND PROTECTED AREAS: DEFINING THE PROBLEMS AND SUGGESTING SOME SOLUTIONS

I welcome this opportunity to present the perspective of a non-expert observer on the relationship between national parks and the communities within which they exist. The points I want to make are not of a technical nature, yet I believe they are important for developing good relationships for the very life of parks.

The areas, most who wish to protect nature are not fully defined in terms of development and environment.

As a result, Parliament, when getting its national park measures well drafted, coming as substantial milestones between the best intentions of the conservation movement and the population of the land itself.

We have seen this with our "National Parks" in the United Kingdom. Initially planning controls at national parks were widely misunderstood and resisted. But gradually, a real alliance between the local people and management agencies — the farmers — and the "conservation" of the parks has developed. A partnership has been forged for the conservation of a unique part of our British heritage.

But in the developing world, where the state is dominant, how does one safeguard the unique genetic pool of the forest — play for scientific study, protect wildlife, conserve traditions and folk arts, the increasing numbers of indigenous people, and so on? The answer must lie in partnership between the park authorities and the local community.

This points towards a pattern of fully integrated land use planning and management, where protection is to provide

Member, Governing Board of Tourism, Can Maldives Trust for Marine Conservation and Chairman, UK Committee of the King Mahendra Trust for Nature Conservation.

economic and social development which is sustainable in time, and does not lead, as so much past development has done — and is capable in such countries of doing — to excessive immediate profit in the hope that the future, prosperity, we look after itself.

In getting on to the guiding principles of such development, I would first observe that what we are about here is not just the preservation of the grand natural

heritage, but also the people who create the life of the park. "The first step, when before the eyes of the people, is to be free of any artificial barriers, are usually the lives of rural districts concerned." The words of Keynes's death certainly seem to have proved true.

From economists long before Keynes, we learned the lesson that economic growth would be defined to be sufficient for the solution of tomorrow's social and economic problems. If you remember that lesson, the treatment, wherever it occurred, is based — on this theory — to produce such wealth as can harness science and technology to mitigate or find ways around tomorrow's problems.

This theory appeared to work as well in the past. In my own country, energy from the timber, much of what we now call the home counties, covered the ground under, made glass and generally helped generate an economic momentum which then burst forward — the fossilised timber of long and northern forests. And coal, with iron, wool and the imported cotton and other raw materials that also became widely available through portland cement, began that complex, historic process of de-ruralisation and "modernisation" which has gone on finding and creating new resources ever since.

In recent years, however, we have learned that the dynamic energy property of capital when applied to technology and altered by science cannot always be channelled

The Search for a Reasonable Balance: Managing of Protected Mountain Areas for Sustainable Development

Sir Arthur Norman, KBE, DFC*

I welcome this opportunity to present the perspective of a non-expert observer on the relationship between national parks and the communities amidst which they exist. The points I want to make are not of a technical nature, yet I believe they are important to developing widespread support for the very idea of protected areas.

Too often, those who wish to protect nature are still falsely depicted as being anti-development and anti-people. In my view this is nonsense. Everybody knows that you cannot have a "hands off" zone of protected land or water in the midst of a sea of poverty and human misery. Quite apart from the morality of the proposition, it is impractical. Poaching, shifting cultivation, removal of firewood and so on will occur no matter how much policing of the perimeter is organised. Furthermore, where policing is successful, social resentment will develop, causing an unfortunate mismatch between the best intentions of the conservation authorities and the aspirations of the local people.

We have seen this with our "National Parks" in the United Kingdom. Initially planning controls in national parks were widely misunderstood and disliked. But gradually, a real alliance between the local income and employment generators – the farmers – and the "consumers" of the parks' benefits has developed. A partnership has been forged for the conservation of a unique part of our British heritage.

But in the developing world matters are more complicated. How does one safeguard the unique genetic pool of the forest – allow for scientific study, protect wildlife, promote tourism *and* look after the increasing numbers of indigenous people, simultaneously? The answer must lie in partnership between the park authorities and the local community.

This points towards a pattern of fully integrated land-use planning and management, whose purpose is to generate

* Member, Governing Board of Trustees, King Mahendra Trust for Nature Conservation and Chairman, UK Committee of the King Mahendra Trust for Nature Conservation.

economic and social development which is sustainable over time, and does not seek, as so much past development has done – and regrettably so much continues to do – to maximise immediate profit in the hope that the future, posterity, can look after itself.

Before getting on to the guiding principles of such development, I would first observe that what we are about here is nothing less than a re-write of the ground rules of conventional, or so-called "neo-classical", economics.

We are all, like it or not, under the sway of some economic theory or other. It was John Maynard Keynes, now almost 40 years deceased, who made the oft-quoted observation that "Practical men, who believe themselves to be free of any intellectual influence, are usually the slaves of some defunct economist." The decades since Keynes's death certainly seem to have proved him right.

From economists long before Keynes, we inherited the notion that accumulated surplus wealth could be assumed to be available for the solutions of tomorrow's social and economic problems. If you maximise short-term gain, the increment, invested at compound interest, is bound – on this theory – to produce such wealth as can harness science and technology to mitigate or find ways around tomorrow's scarcities.

This theory appeared to serve us well in the past. In my own country, energy from the timber wealth of what we now call the home counties, smelted iron, tanned leather, made glass and generally helped generate an economic momentum which then harnessed coal – the fossilised timber of long-sunk northern forests. And coal, with iron, wool and the imported cotton and other raw materials that also became newly available through previous investment, began that complex, headlong process of industrialisation and "modernisation" which has gone on finding and creating new resources ever since.

In recent times, however, we have learned that the resource-creating property of capital when applied to technology and steered by science cannot always be counted

upon to pave the way forward like the circulating steel links of a bulldozer's tracks. In rich countries as well as poor, soils themselves are easily exhausted or eroded away, the wellsprings of groundwater become poisoned, and the very climate can be altered so as to throw in doubt many assumptions as to future patterns of growth, but in particular to cast doubt upon this classical economic assumption.

Thus, rather than counting upon maximising every possible immediate return, and assuming that the yield of its reinvestment will "see us through", we have been forced to reconsider. We have had to look again at earlier ideas of husbanding resources: setting limits, and steering investment so as to conserve our most basic resources, energy, soils, air and water – in fact the fundamental elements, "air, earth, fire and water" of the medieval alchemist – and of course the vegetative cover that they make possible and useful. For these are the resources that remain fundamental to us all, yet which cannot rapidly or readily be replaced, however much money is poured into them.

Today, our sense of survival is again steering our economic thinking or at least it is beginning to, rather than the other way round. Yet the wealth to do that steering has still to be produced. So we are searching for a new balance.

The International Institute for Environment and Development, under the inspiration of that remarkable economic and environmental thinker, the late Barbara Ward, has in particular been dedicated to this search. The target: an elusive, yet readily conceivable concept that we call *sustainable development*.

The IIED, together with other like-minded bodies, some of which are represented here, is studying steps towards this goal, and is evolving some simple principles. It has produced five, in particular, which I commend for your consideration.

- development must be aimed at the basic needs of the poor, so that they do not destroy their environment in order to survive;
- it must be sensitive to the culture and traditions of the indigenous people;
- it must involve proper consideration of the carrying capacity of the natural resource base;
- the technology employed must be **appropriate to** the place in which it is applied and;
- the result must be income-generating for *all* those involved.

Unhappily, much development comes nowhere near meeting these simple criteria. The results are all-too-often disastrous, because of inappropriate scale, lack of education and motivation, corruption or bad planning.

Turning now to the more specific issue of protected areas, I believe that the Declaration of the World Congress on National Parks, held in Bali in 1982, not only spelled out the reasons for having a worldwide mosaic of protected areas, but it also recognised the social, economic and cultural context in which parks must exist. The Bali Declaration was quite clear on all these points. It also laid stress on educational programmes, revenue sharing, participation and complimentary development schemes adjacent to protected zones for the people who live on the perimeter of them. We would all do well to remember this clause of the Bali Declaration.

I feel sure that your deliberations at this Workshop will help advance integrated thinking, planning and project execution. I hope too, that they will advance the understanding that parks and protected areas can make an important contribution to creating wealth through tourism, both national and international.

Tourism, as we are all well aware, has its pluses and its minuses in the balance sheet of a country's social and economic development. Nations need the revenue that it brings and the employment that it can generate. But they do not need the pollution that it can propagate, nor increased inequality of income it so often encourages.

In the case of each of the developing countries here represented, scenery, cultural features and treasures and wildlife, both fauna and flora, represent a major national asset that can be squandered or managed on a sustainable-yield basis, so that they remain available as sources of income and inspiration for the indigenous population now and in the future, as well as to the foreign visitor.

Moreover, tourist potential can be a *growing* asset for developing countries as the wealth and mobility of populations of other countries increases, and as their own tourist attractions become over-crowded or commonplace to people fed an increasingly exotic diet of television feature films on the wild places and cultural heritage of other lands.

To close the doors to this tide is to miss a major opportunity for economic benefit and better international understanding, an understanding which may, I suspect, link back to a better recognition among taxpayers as to why they should support and care about economic aid. On the other hand, to open the flood gates, failing to integrate tourism with the needs of national parks, protected areas, and above all the needs of the local people, is to pursue an unsuitable path.

Beyond the calculus of social and economic gain and loss, what we are all, I believe, searching for, is a new, all-embracing ethic. We need this ethic to guide us to a wider and fuller set of values. In the last analysis, sustainable development means taking our places amidst our surroundings with greater awareness of what it means to be both a part of them, and yet, to some degree, an objective outside observer: to be at once a part of, and apart from nature.

Only when we all start to face the dilemmas, which this ambivalence must produce in us, will we recognise that just as we are interdependent one upon another, so we are with the flora and fauna, with our traditions of culture, even with the inanimate resources which make up our total environment.

The great biologist and humanist Rene Dubos summed it up well in his book *So Human an Animal*, when he wrote, "It is impossible to speak of an environment optimum to man, if one has only man in mind."

ABSTRACT. This paper outlines some of the potential problems Nepal has faced in conserving its natural heritage, including conflicts between park management and local people, conflicts between local people and wildlife, control of the impact of tourism, and uncertainty around protected areas. The paper also offers some new directions in addressing and alleviating park-people conflicts in the region, including aspects of access to park resources, facility of movement through protected areas, economic incentives, local participation in decision making, conservation education, and management of protected areas as part of the total landscape.

1. INTRODUCTION

Endowed with unparalleled natural beauties, Nepal ranks as a source of attraction for all travellers who consider natural areas as a precious heritage. The contrasting topography, a wide variety of climates and a diversity of flora and fauna have attracted thousands of tourists who seek inspiration from their views, admiring the and the scenic beauty of the high Himalaya. The elevation starts gently from less than 100 m from the flat alluvial plain to the rugged Himalayan peaks, eventually reaching 8,848 m at Mount Everest in the north. A wide range of ecological conditions, including the glaciers of the Himalaya, subalpine forests of the mid-mountain, tropical forests and the fertile plains of the south, exist within a short span of about 200 km.

Inevitably, Nepal lies in the transitional zone between the Indomalayan and Palaearctic realms. While very few endemic animal species have evolved in the Himalaya, more than 300 species of mammals and 850 birds have been recorded in Nepal. There are about 10,000 indigenous plants in Nepal of which over 5,000 species have been identified.

Forests cover approximately 31 per cent of the hilly and mountainous regions of the country but these are receding under the combined pressure of population growth and increasing demand for fuelwood and timber. About a decade ago the forests of Nepal were estimated at 6.6 million ha, but at present it is only 4.6 million ha.

Over 87 per cent of the nation's energy is used by forest products and each person consumes one cubic meter of wood per year for this purpose. Nepal's 18 million people depend heavily on its natural resources as 77 per cent of the people derive their livelihood from agricultural and allied activities. The total population is increasing at 1.2 million, requiring 3.4 million tons of fuelwood.

The destruction of forest ecosystems is especially tragic when it results in the disappearance of species which have a small geographic range and are adapted to a narrow range of habitats. In the course of the trans-Himalayan region wild yak and Himalayan blue sheep have now been sighted for several years and four-headed antelope and pigmy hog are probably extinct in present Nepal. Black buck, once thought to be extinct, are now periodically occurring in one herd of about 100 on a restricted patch of forest in India. Equally endangered is the snow leopard, which has suffered a dramatic decline in population in just a few decades primarily due to poaching for skins and killing by shepherds. At present the surviving snow population is estimated at about 400. The number of tigers is estimated at slightly more than 200 and wild elephants are fewer than 20 in Nepal.

Some time ago a World Bank report estimated that if the present trend of destruction continues, all forests of Nepal would disappear from the hills in about 11 years and from the Terai in about 25 years. If the indigenous forests cease to exist all the genetic resources of various wild unknown plants and animals will disappear also.

Faced with such a grim situation, declaring national parks and other protected areas offers the best possible opportunity to save at least some representative samples of these resources.

In 1970, His Late Majesty King Bhabendra approved a conservation programme which outlined the establishment of national parks and wildlife reserves in areas of Nepal chosen specifically to represent the country's various habitats. Nepal now has six national parks, five wildlife reserves and one hunting reserve encompassing about 12,000 sq km or 7 per cent of the total area of the country.

The Park - People Interface in Nepal: Problems and New Directions

B.N. Upreti

ABSTRACT. *This paper outlines some of the perennial problems Nepal has faced in conserving its natural heritage, including conflicts between park management and local people, conflicts between local people and wildlife, control of the impact of tourism, and antipathy toward protected areas. The paper also offers some new directions in addressing and alleviating park-people conflicts in the region, including aspects of access to park resources, facility of movement through protected areas, economic incentives, local participation in decision making, conservation education, and management of protected areas as part of the total landscape.*

1. INTRODUCTION

Endowed with unparalleled natural beauties, Nepal reigns as a centre of attraction for all mankind who consider natural areas as a common heritage. The contrasting topography, a wide variety of climates and a diversity of flora and fauna have all enchanted naturalists who seek inspiration from clean water, refreshing air and the serene beauty of the high Himalaya. The elevation rises rapidly from less than 100 m from the flat alluvial south to the various Himalayan peaks, eventually reaching 8,848 m at Mount Sagarmatha in the north. A wide range of ecological conditions, including the glaciers of the Himalaya, verdant landscapes of the mid-mountains, tropical forests and the fertile plains of the south, exist within a short span of about 200 km.

Biogeographically, Nepal lies in the transitional zone between the Indomalayan and Palaeartic realms. While very few endemic animal species have evolved in the Himalaya, more than 100 species of mammals and 850 birds have been recorded in Nepal. There are about 10,000 indigenous plants in Nepal of which over 6,000 species have been identified.

Forests cover approximately 31 per cent of the hilly and mountainous regions of the country but these are receding under the combined pressure of population growth and increasing demand for fuelwood and timber; about a decade ago the forest area of Nepal was estimated at 6.4 million ha. but at present it is only 4.4 million ha.

Over 87 per cent of the nation's energy is met by forest products and each person consumes one cubic meter of wood per year for this purpose. Nepal's 16 million people depend heavily on its natural resources as 93 per cent of the people derive their livelihood from agricultural and allied activities. The cattle population is estimated at 15 million, requiring 5.6 million tons of fodder.

The destruction of forest ecosystems is especially tragic when it results in the disappearance of species which have a small geographic range and are adapted to a narrow range of habitats. In the steppe of the trans-Himalayan region wild yak and Hodgson's wild sheep have not been sighted for several years and four-horned antelope and pigmy hog are probably extinct in southern Nepal. Black-buck, once thought to be extinct, are now precariously surviving in one herd of about 100 on a cultivated patch of land in Bardiya. Equally endangered is the snow leopard, which has suffered a dramatic decline in population in just a few decades primarily due to poaching for skins and killing by shepherds. At present the surviving rhino population is estimated at about 400. The number of tigers is estimated at slightly more than 200 and wild elephants are fewer than 30 in Nepal.

Some time ago a World Bank report suggested that if the present trend of destruction continues, all forests of Nepal would disappear from the hills in about 15 years and from the Terai in about 25 years. If the indigenous forests cease to exist all the genetic resources of known and unknown plants and animals will disappear also.

Faced with such a grim situation, declaring national parks and other protected areas offers the best possible opportunity to save at least some representative samples of those ecosystems.

In 1970, His Late Majesty King Mahendra approved a conservation programme which initiated the establishment of national parks and wildlife reserves in areas of Nepal chosen specifically to represent the country's unique habitats. Nepal now has six national parks, four wildlife reserves and one hunting reserve encompassing about 11,000 sq km or 7 per cent of the total area of the country.

2. SOURCES OF CONFLICT

2.1 *Park-people interface*

In the Himalayan National Parks of Nepal, indigenous human settlements, originally few in number, have been allowed to remain, although the villages proper are excluded from the park boundaries. In the parks of the Terai there is technically no human settlement within the boundaries.

However, the park-people interface is omnipresent.

Prior to the establishment of parks and reserves, local people were free to collect fuelwood, timber, fodder and thatch grass from the forest. Local people were dependent upon it for grazing and fodder for their livestock, bamboo and medicinal herbs for their livelihood and fishing and hunting for a major source of protein.

With the declaration of parks and reserves in such areas many people have been legally restrained from using their traditional rights to these resources. Those people living outside the boundaries have no legal recourse to procure compensation for their lost benefits. They ask themselves why they have been deprived of this inexhaustible natural resource which is a common property of the community. They think that it is unjust that "outsiders" impose these restrictions and they express their feelings of discontent in various ways. Their reactions are revealed by not obeying the park regulations and by engaging themselves in prohibited activities such as grazing animals and smuggling firewood, timber and grass from within the boundaries, particularly in Terai areas. To demonstrate their anger they sometimes vandalise park property by damaging bridges, signposts and boundary pillars.

In the Himalayan parks, requirements such as firewood, timber and grazing have to be met from within the protected areas. A firewood consumption survey conducted in Sagarmatha National Park has estimated about 350 metric tons of firewood are consumed per annum. Another survey has shown that about 3,000 domestic animals graze in the park areas all year round. Here the management faces a challenge of maintaining high standards with adequate protection of its natural resources while meeting the requirements of local populations. Requirements of natural resources should be made available through appropriate forestry practices in "facility zones" set aside for this specific purpose. More fuelwood plantations and reforestation in degraded areas will improve the natural environment and lessen the conflicts between the parks and the people.

2.2 *Human-wildlife interactions*

Crop damage – Agricultural crop raiding by wildlife just outside the parks and reserves is very common in the Terai area. When the park staff catch grazing domestic

animals the first question locals ask is why wild ungulates are set free to raid their crops.

A study conducted in Chitwan identified three zones of crop damage by wildlife and the zone of highest damage suffers from 50 to 100 per cent loss. A large number of people from such zones either wish to resettle or are deeply concerned that His Majesty's Government take other effective actions such as fencing or crop loss compensation (Milton and Binney, 1980).

Crop damage by rhinoceros in Chitwan is very heavy. However, most damage occurs within 750 m of the forest (Laurie, 1978). Crop raiding by spotted deer is most frequent; some damage is done by elephants as well. The parakeet is notorious for destroying crops such as rice, wheat and maize. Langur and Macaques monkeys are troublesome, causing considerable damage to the crops. As there are villages well inside the mountain parks the depredation of crops by wildlife is inevitable and causes hardships to subsistence farmers. Wild pig damage is frequent in the mountains as well as the plains. The slow-growing high altitude crops such as barley and buckwheat are repeatedly destroyed by them particularly in Rara and Langtang National Parks. The black bear and Himalayan thar also destroy crops in areas such as Sagarmatha National Park. The management authorities are considering introducing some system of authorised killing of persistent marauders such as wild pigs.

Encounters between man and wildlife. – Encounters with wild animals around the national parks and reserves have become a source of legend. Should any animal from a park kill or molest somebody a furor is created and all the blame falls on the park authority. The incidents of being knocked down by wild animals in Chitwan and other places are often in the news.

In Chitwan the most notorious animal is the great one-horned rhino which when approached closely has killed or knocked down a few persons annually, including careless tourists. Killing of people by wild elephants occurs more frequently in Royal Sukla Phanta and Royal Bardiya wildlife reserves. In the mountains, we often hear about leopard, bear and wild boar attacking human beings. A few years ago in Langtang National Park, a local leader was attacked by a wild boar, and when his father tried to rescue him the rescuer himself was killed. If such incidents involve local politicians, the park management authority then has a particularly tough time. In Chitwan when a tiger killed one school teacher in the bush by accident the local politicians got spice for their individual political interests. I witnessed a rude mob this winter when an old tigress caused panic in Madi, south of Chitwan National Park. Eventually, we were forced to dispose of that tigress. Surprisingly, most of these killings by tigers have occurred inside the park boundaries. In Chitwan one tigress killed four persons when all of them were cutting grass stealthily inside the park. The management cannot ignore such incidents without giving due attention to the suffering of

the local population or the means of pacifying the disgruntled villagers. In fact, talking about conservation without giving adequate importance to human life and property is futile, as far as maintaining the stability of the parks and reserves is concerned.

Loss of livestock to predators. – Cattle-lifting by tigers is a very widespread phenomenon along the border of parks and reserves. Out of a total of 156 large mammals killed by tigers in Chitwan, two-thirds were wild animals and one-third livestock (Tamang, 1982). Leopard, snow leopard, black bear and wolf also kill yak and sheep in the mountains. This has serious repercussions on the local economy.

If a water buffalo or a bullock representing a high investment is killed by a tiger, the owner naturally holds a grudge against the park for a long time. At present there is no mechanism to compensate for this loss. Therefore, such incidents are a major source of conflict between the park and the people.

Fishing and hunting. – The ethnic groups of the Terai, especially the Tharu, Bhote and Barai, traditionally rely on fish and other aquatic animals for an important source of protein. The Narayani River system, including the Rapti and the Reu in Chitwan, is heavily fished by the locals and some of them depend entirely on fish for their livelihood. (Refer to Annex VI) Realising the significant role of fish in the socio-economic system of these areas, subsistence fishing with permits has been granted by the park management. However, for the survival of the endangered gharial, crocodile and dolphin, fish are essential, so no commercial fishing is permitted in the waters of parks and reserves. Even traditional fishing in Karnali River in Royal Bardiya Wildlife Reserve has directly affected the food supply of the dolphin. Often DDT is spilled into the water or dynamiting is done to catch fish and this has adversely affected the population of fish.

In high-altitude national parks, occasional poaching of wild animals such as musk deer, blue sheep, and Himalayan thar is of much concern. Poaching for the musk business is a great threat to the survival of this species. I have personally encountered many snare lines set to trap these animals in Sagarmatha National Park. The musk deer population has been drastically reduced throughout Langtang National Park and poaching is still rife in remote areas (Green, 1981). Unless effective measures are taken the species may be extinct not only in the parks, but throughout the Himalaya.

In Chitwan, poaching of rhinos was prevalent when the park was first established. At present, however, except for a few stray cases it has been completely controlled.

Animals such as spotted deer and wild pig, which come out to raid the crops at night are occasionally shot by poachers, who even try to enter park boundaries in pursuit of wounded animals. There are many legal cases in the records against such offenders.

Poaching, whether inside or outside the boundaries, is not the work of the general public. It is mostly done by a few professionals or by the well-to-do village folks. Very few people in stark poverty indulge in these illegal activities with commercial motives.

Antipathy towards parks and reserves – Activities such as control of movement and right-of-way, penalties for the illegal grazing of animals, and restrictions on the collection of firewood are the main causes of resentment among the local people, at least in Royal Chitwan National Park. One assessment of the perception of the local people towards park and wildlife surmises that the major concern is the hardship imposed on them by park regulations, and the crop losses due to marauding wildlife. It is very difficult for villagers to understand why wildlife can damage their crops but they cannot kill in return. They often ask why the rhino is more important than the people, and whether this park is established to entertain tourists at their cost. They are not convinced by the rationale of protecting forest and wildlife which they have been using for many years.

Another main complaint is way the park staff behave with them in handling cases. To win goodwill and the support of the general public special skills are needed for which the staff should be trained. A comprehensive programme of public relations could help the tensions arising through conflict of interests.

Tourism – One of the objectives of management is to promote tourism in parks and reserves so long as it is not detrimental to conservation programmes. However, tourism is slowly putting pressure on the scarce natural resources of the Himalaya. Sagarmatha National Park, being a paradise for trekkers and a Mecca for mountaineers, is faced with an array of environmental problems which affect its basic goal of conservation.

The tourism industry is a major source of foreign exchange earnings for Nepal. A keen interest from all corners has been shown for its development. But whenever tourism has developed, its ill effects have started surfacing. In a cold place such as the Himalaya a huge quantity of firewood is needed for tourists and for mountaineering expeditions. In the last five years it has been estimated that about 25,000 to 30,000 kg of firewood was consumed in Sagarmatha National Park by three major expeditions. More houses and tea shops have come up in the park areas to serve the increasing flow of tourists, consequently exploiting more forests for timber and firewood. Due to such heavy pressure on slow-growing temperate forests, deforestation is taking place on an unprecedented scale.

Sanitation along the trekking route is getting worse and litter is increasing day by day. Tin cans and plastic bags brought by trekkers and expeditions have desecrated the environment.

Traditional life styles and local cultures are becoming influenced by the imitation of exotic ways of life. Villagers

around many parks are facing price inflation, especially of food such as rice, chickens, eggs and goats due to tourism. They complain that inflation is one of the unwanted sufferings bestowed on them by the park development.

On the other hand the tourist industry is so important in the local economy that almost every household in Namche Bazaar in Sagarmatha relies on tourism for their income. In other parks too, tourism is providing job opportunities for guides, porters and lodge staff. National Park Offices employ a number of locals as park staff and engage them as labourers in development works.

The impact of tourism in Royal Chitwan National Park is not of the same intensity as in the Himalayan national parks. The deforestation problem and other environmental problems are also much less, but job opportunities are fewer than in the mountains.

3. NEW DIRECTIONS

I would like to stress the fact that our beloved Sovereign His Majesty King Birendra Bir Bikram Shah Dev is extremely concerned about the conservation of natural resources. He is equally conscious about the well-being of his subjects and has given directives to park planners to invite local people and listen to their reactions about park management.

It is a challenging job for a developing country such as Nepal to protect its natural resources and to meet the requirements of the people on a sustainable basis. However, to maintain the environment for a better quality of life we must bring into balance resource use and conservation. For this we must see the problems in a bigger perspective and focus our attention on improving the economic standard in the surrounding communities and on managing all the available natural resources in the adjacent areas of the parks. If the local communities do not embrace the conservation ethic and if they always remain hostile to parks and reserves, it is senseless to think that law enforcement alone can protect natural resources. To win their support a mechanism should be developed for compensating losses, and fostering a feeling that parks and reserves belong to the people. In addition, we must extend our help beyond the park boundaries to community development work. Here I outline several opportunities to link conservation with local development.

3.1 *Access to park resources*

At present people residing inside the Himalayan parks have easy access to firewood collection and grazing their cattle. They can get construction timber with permits from the park warden. In the future to meet the different requirements of management, the parks should be managed under a zoning system where Strict Natural Zones, Tourist Zones, Facility Zones and Cultivated Landscapes will be sub-divided with appropriate management policies. The

local demands for natural resources will be fulfilled from the Facility Zones.

In Rara National Park gathering of pine needles from the park has been permitted for a period of 15 days in a year. Perhaps we can even issue permits to collect dry branches and dead wood for fuel on a controlled basis. Collecting thatch grass, reed and sabai grass (for rope making) has been permitted in all the parks and reserves in the Terai. In Chitwan alone between 30,000 and 50,000 permits per annum have been issued over the past years and over 66,830 tons of grass on average have been removed annually (Mishra, 1982).

Together with grass, hidden in bundles, tons of dry sticks and dead branches go out of the park as firewood during grass-cutting season. The total value of the grass and reed taken out from Chitwan alone has been estimated at more than US\$ 891,985 per annum. The only problem caused to the park management is a sudden migration of thousands of people roaming in the parks and setting fire whenever they like. For 15 days the parks look like fairgrounds. However, the park must sacrifice this much to the local people in order to establish good relations.

3.2 *Facility of movement through parks and reserves*

The Park Regulations stipulate that for the convenience of the public, right-of-ways can be granted on specific routes. Movement through the park, especially in the Himalaya, by the local residents or persons whose access to their village is only through the park is unrestricted and they are free to move in the evening as well as in the early morning hours. In the Terai the use of the right-of-way is restricted between the period of sunset and sunrise. The main aim of this provision is not to create hardship for the locals, but to keep strict vigilance for possible offences.

3.3 *Economic incentives*

Why do local people continue to risk severe punishment in order to exploit park resources? The subsistence farmers with little purchasing power have few other alternatives for grass and firewood essential to their livelihood. Their lifestyle should be slowly changed by other income sources such as tourism. For example, Sherpas in the Sagarmatha area were doing a barter type of business in Tibet prior to the development of tourism in that region. Once expeditions and trekking tourism started, their whole lifestyle changed and a better economic standard has been achieved. For that reason alone we must develop tourism programmes in the villages adjacent to the parks with the bulk of tourism proceeds going to the villagers. The local people should be trained to organise trekking for community-oriented business and to run the community lodges. There could be handicrafts and gift shops run by the community by collecting articles from the villages.

Business similar to Chitwan's "Tharu Village Lodge" can be handled by local communities in many other areas.

Development of community funds: a revenue sharing scheme – If parks and reserves can help rural development programmes in neighbouring areas, there will be convincing points in favour of conservation. The idea of collecting funds from park users for community development has been considered for a long time. However, in the absence of an appropriate mechanism for collecting the funds and using them for development, the idea has not been put into practice. Recently, the King Mahendra Trust for Nature Conservation has started collecting funds from park users for conservation works. Development funds from tourist contributions and revenue-sharing with the government will directly help community development.

Complementary development schemes – When we had a discussion with local leaders in Chitwan about the park's contribution to the neighbouring communities, they suggested a network of permanent roads in adjacent villages with an electricity line along it. Local people also want an uninterrupted supply of irrigation water from parks and reserves where sources are mostly located. Other programmes which can be assisted by the scheme are supplies of drinking water and sanitation, building of schools, medical dispensaries and veterinary clinics. These development works can be implemented with international support or with community development funds as mentioned above.

3.4 *Local participation in decision making*

The local people should have a voice in the management of the parks, provided the voice does not conflict with the main objectives of sustainable conservation of natural resources. One of the essential elements of successful management is to create a proprietary interest of the local people in the park.

A local council comprised of people directly affected by the park, District Administrators and the Park Warden can discuss and solve the problems arising from management as well as from local people. An advisory committee headed by the High Lama of Thyangboche was set up in Sagarmatha National Park some time ago, and it is quite helpful in fostering local involvement. A programme of annual meetings of the local panchayat leaders, school teachers and influential ladies and gentlemen of the adjoining area is conducted regularly in all the parks and reserves of Nepal. The Park Warden explains to them the aims and objectives of management and takes them on the spot to see the development and success of conservation. The complaints and suggestions from them are heard and actions are taken if possible.

I hope this concept of annual meetings and local advisory council programmes will be adopted and followed strictly in all the parks and reserves. This will definitely promote appropriate linkages between the management authorities and the local people.

3.5 *Conservation Education*

Among the general public, there is little understanding of the value of the unique flora and fauna of the country and they are also unaware of the need for environmental conservation. This ignorance is a major source of conflict between park planners and resource users. I feel that the success of the conservation of resources and protection of parks and reserves as a whole largely depends upon the understanding of the people and their acceptance of the concept of conservation.

The Department of National Parks and Wildlife Conservation has initiated comprehensive programmes in the past to provide information to the general public about our natural resources and their conservation. They included press releases, feature articles, news bulletins and information supplied to the local columnists. The value of such material in terms of conservation is somewhat limited, due to circulation difficulties. The most effective medium we have found is radio, which is heard by many people in the mountains as well as in the plains. Radio Nepal broadcasts a regular 15-minute bi-weekly programme under the auspices of the Ministry of Forests and Soil Conservation. We feel that greater use should be made of broadcasting. Audio-visual programmes also have greater audiences and leave lasting impacts on the simple minds of the village people, who should be our main targets. A documentary film such as "A Fragile Mountain" has a straight-forward message to the people who misuse the lands. A similar message in a slide programme could be quite useful to create awareness among the people. The awareness of proper management of the resources will definitely convince the neighbours of parks and reserves to live in harmony with the high ideals of nature conservation.

3.6 *Management of the total landscapes in the region*

While protecting national parks and reserves, it is equally important to manage all the natural resources of the regions in larger perspective. "Protected areas cannot be seen as islands which exist in isolation from their surroundings. They are an important part of the region in which they are situated, and the mutual relationships and linkages between them and adjacent land must be understood and applied to management" (Garret, 1982).

To lessen the pressure on parks and reserves and to meet the local requirements, development of the surrounding buffer zones is essential. Development of agro-forestry schemes, reforestation of marginal lands, reclamation of the river banks by plantations and management of forest patches adjacent to the parks could help in the maintenance of the buffer zones. And this concept of buffer zone management may in some cases minimise the conflicts and help save the parks and reserves.

The activities conducted elsewhere in the region may also cause damage to the resources of the park. In Royal Chitwan National Park, in particular, a successful gharial

crocodile breeding programme may be threatened by the construction of two large pulp mills which will dump effluent into their riverine habitat.

The boulder extraction downstream and motor boat operation upstream in Geruwa River in Bardiya Wildlife Reserve is causing disturbances to the river habitat of many endangered species. Such uncoordinated actions need immediate attention and a regional concept of total landscape management should be considered.

4. CONCLUSIONS

While highlighting the complexity of conservation issues, HRH Prince Gyanendra (1984), emphasised that the rational use of resources requires a realistic approach in order to strike a balance between the needs of the growing population and those of nature conservation. In the Third World Congress on National Parks, Assistant Director-General of FAO, Marco Flores Rodas expressed his views that "Until the rural people are ensured adequate food and

shelter and a dignified standard of living, all efforts to establish and manage national parks and protected areas will be futile". International conservationists are becoming more inclined towards the human aspects of nature conservation. However, in a developing country such as Nepal the problem has been so complex, with more people and less resources, that without providing an alternative resource, park planners will face difficulties in maintaining the parks and reserves in the long term.

As discussed above the stress on natural environment is mainly due to our socio-economic conditions, intrinsic behaviour, cultural traits and ignorance of consequences. Our approach to redress the ill effects of environmental misuse should be in multiple directions, from improving the economic standard to changing the attitudes of the people. We now have to ignite a spark of awareness, and hopefully wait to see that all the debris of environmental misuse will be burned by our rational actions. We have to work together to preserve our common natural heritage so that our country will remain a better place to live in the future.

Man and Nature in the Himalaya: What Can Be Done To Ensure That Both Can Prosper

Jeffrey A. McNeely

ABSTRACT. *This paper reviews what can be done to ensure that development is carried out in such a way that both man and nature can prosper. It is apparent that conservation – “the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations” (IUCN, 1980) – is necessary for development, just as development is necessary for modern forms of conservation to take place. Principles of conservation for development include building upon the foundation of the local culture, linking development programmes with conservation action, giving priority to small-scale local developments, fully involving local people in the development process, examining options for protection of species and ecosystems and provide viable alternatives, enforcing restrictions where these are necessary, building conservation into the evolving new national cultures, and going with diversity.*

1. INTRODUCTION

A small sign nestled among the pines by the side of a road in central Bhutan quotes the Lord Buddha: “The forest is a peculiar organisation of nature that makes no demands for its sustenance and extends protection to all beings, offering shade even to the axeman who destroys it.”

This quotation encapsulates the relationship between man and nature in the Himalaya. There is broad appreciation of the values of the forest, water, wildlife, and soils that support human society in this often inhospitable environment. But at the same time, nature’s productivity is being threatened as people attempt to wrest more from the environment than can be sustained.

In mountain areas close to the tree-line, and in a climate where wood is required for house-building, as fuel for cooking and heating, and as trees to protect villages from avalanches and landslides, deforestation is a danger to the very existence of many village communities. Most mountain peoples have responded to this danger by developing ways and means of conserving the forests. One of the best known is the Sherpa custom of *shing-i-nawa*, or forest

guards, where several men from a village are elected to protect the forest which protects the village. They also have the power to prevent cutting of protection forests, determine where trees may be cut, inspect firewood stocks in people’s houses, and levy appropriate fines for transgressions. Their power is reinforced by annual celebrations where the fines are paid and the perpetrators are subjected to good-natured ridicule by their peers.

This mechanism worked for many years in Khumbu to prevent unrestricted fellings which would threaten the community. Writing in 1964, von Furer-Haimendorf concluded, “Compared with the forests of lower and climatically more favoured regions where peasants of Chettri, Brahman, and Newar stock have in recent generations wrought enormous devastation, the forests of Khumbu are on the whole in good condition. This is mainly due to an efficient system of checks and controls developed and administered by a society which combines strong civic sense with a system of investing individuals with authority without enabling them to tyrannise their fellow-villagers.”

But times have changed in Khumbu since von Furer-Haimendorf wrote over twenty years ago, and the forests of Khumbu have now been seriously depleted by rapid economic development, as the central government assumed responsibility for the forests. Once the local Sherpa villages lost direct control over the forests, their strong cultural controls against over-exploitation were lost (Jeffries, 1984).

In the western Himalaya, where tree growth is limited by low rainfall, the situation may be even worse. George Schaller pointed out the irony of the situation in Pakistan: There are large forest departments but few forests, and no range management departments even though much of the terrain was rangeland.

“Many treeless slopes, now useless wastes of rock, as those around Chitral and Gilgit towns, were forested until recent times,” says Schaller (1977). “About 22 million kg of firewood were used by the military in the Gilgit Agency during 1973. Herds of sheep and goats have denuded most uplands. With a predilection for certain grasses and forbs,

livestock have eliminated much of the palatable forage, leaving behind primarily those plants which can somehow protect themselves . . . Asian ranges consist not just of pristine peaks untrodden by man, an impression left by the books of mountain climbers, but also of populated areas where man is an enduring presence whose activities have had a devastating effect."

In conclusion, Himalayan villages need forests, and in traditional times forests were conserved by strong social controls which constrained individual behaviour for the benefit of the larger society. But in the face of change, traditions are fast fading into memories and are no longer able to control over-exploitation of the forests. If people are to again live in harmony with their environment, then new means of conservation are needed to balance the new forces of exploitation. Building on traditional common property regimes, the new means should be based on assigning direct responsibility for resource management to the local community.

Mountains have always provided isolation, encouraging cultural diversity as peoples sought refuge in the mountains and developed local adaptations to locally available natural resources. For example, in eastern Nepal, the various groups of the Rai stock historically had mutually unintelligible dialects from one valley to the next, and had their most important trade relations not with their Rai neighbours but with certain villages in the Indian lowlands.

Himalayan life is often based on exploitation of a wide range of environmental conditions; farmers have a series of small fields at different elevations, and take their animals to higher elevations during the rainy season, when the short growing season provides plentiful grass above the timber line. There is also great diversity in breeds of plants and animals. Farmers may have their rice fields distributed over 1,000 meters in elevation, growing as many as twenty varieties of rice, each planted in a specific microclimate, depending on temperature of irrigation water, resistance to pests or other environmental stress, and ripening time. Their strategy is to provide an assured minimum yield to their families, with any surplus being a bonus which could be traded or given to the local temple.

2. CHANGES COME TO THE HIMALAYA

With growing mountains, eroding soils, variable climate, and shifting human cultures, change is the only constant in the Himalaya. Nature has always been strong enough to adapt to these changes. But a number of recent changes have been remarkable in their power to affect human societies and in their impact on the natural environment. I will briefly highlight just a few of these inter-related changes.

2.1 Food

The introduction of maize and potatoes in the 19th century led to a great increase in the amount of food

which could be grown in mountain conditions, along with corresponding increases in the human population. The potato, adopted by the Sherpas as their staple in the late 19th century, now constitutes nearly half the adult diet (Weitz, 1981).

While the green revolution is unquestionably bringing real benefits to many parts of the Himalaya, there are a few problems:

- Increased yield often requires capital inputs (fertilisers, pesticides) which only the wealthiest farmers can afford without mortgaging their land to urban moneylenders;
- The genetic diversity of crops is being reduced, as the "miracle crops" are not so narrowly adapted to microclimatic conditions;
- The variety of crops grown by each farmer is being reduced, leading to a gradual impoverishment of the local soils and cuisine and increases of nutrition-related diseases.

Game has always provided a bit of extra protein to the local people, but recently it has been greatly over-exploited, especially in Tibet, where the rich grasslands once supported vast herds of grazing animals. The introduction of modern firearms and modern transport, coupled with a break-down in local traditions, have filled local bellies for a few years, but have led to a disastrous decline in the Tibetan fauna and a virtual loss of a potentially renewable food resource.

2.2 Tourism

Tourism, in the sense of travel away from home for whatever reason, has long been a feature of the Himalayas. Anyemaqen, a sacred mountain for Buddhists in Qinghai, draws thousands of pilgrims each year; the most devoted spend several months measuring the 180-km circumference around the mountain with their bodies by prostrating themselves inchworm-style on the ground (Schell, 1982). Mount Kailas in Tibet is worshipped by Hindus and Buddhists alike as home of their gods and the navel of the world; it also serves as the source of four mighty rivers: the Ganges, the Indus, the Sutlej, and the Tsangpo-Brahmaputra. Many other pilgrim destinations are spread throughout the Himalaya.

In recent times, modern air travel and disposable income have brought increasing numbers of foreign tourists to the Himalaya. Tourism is now the leading foreign exchange earner in Nepal, and brings significant income to Jammu and Kashmir as well as certain other parts of the Himalaya. In Nepal, for example, the number of trekking permits issued increased from 40 in 1965 to 27,400 in 1980. Trekking tourism has the advantage of spreading the benefits fairly broadly, through use of local guides and porters and purchase of local crafts, fuel and food.

In some Himalayan countries, mountaineering expeditions are very big business. But they also have a very big impact on the environment. The 1981 Hiunchuli expedition in Nepal, for example, "hired two porters as woodcutters, and they made repeated trips over difficult terrain down 3,000 feet to Modi Khola gorge to collect wood". They were sanguine about their impact: "The forests of the upper Khumbu Valley in east Nepal were stripped years ago by the numerous expeditions to Everest; the same fate undoubtedly awaits the Modi Khola" (Cumings, 1983).

But, in an environment which has just enough food and fuel to provide a bare subsistence for the local people, tourism has its disadvantages:

- The lure of cash encourages villagers to sell their best food – such as eggs and chickens – to tourists, thereby reducing the supply of protein for the village; perhaps worse, farmers may sell their surplus productivity to tourists rather than donating it to the village temple where it used to be redistributed to other villagers in need.
- Unequal distribution of income from tourism can lead to social instability at both national and village levels.
- Tourists tend to need more fuel per capita than farmers, for cooking their food and warming their hands around a campfire; where forests are already severely degraded, this can be a very serious problem.
- Sanitation can also be a major problem, especially for the larger expeditions (some of which have hundreds of porters and dozens of climbers), and water supplies for some Himalayan villages are no longer safe to drink.

Other problems, such as outrageous tourist behaviour, increased materialism, and visual pollution tend to be more moral and aesthetic than ecological, though nonetheless important.

2.3 Access

The human back has always been the most important means of transport in most of the Himalaya, though pack animals – especially yak – are also important in some of the higher areas. This has limited the expansion of the economy to that which could be carried by a porter, so export goods have tended to be of high value for their weight: ghee, ganja; salt, wool, musk deer pods, and handicrafts.

But roads and airstrips have suddenly opened up new economic possibilities, both bringing in tourists and providing the opportunity for export of food, wood, and other goods. The village economies are transformed from a locally independent subsistence level to a more

dependent and more productive part of a nation, but the temptation to over-exploit local resources for export earnings is difficult to resist, especially when the over-exploitation is officially encouraged by the central government.

2.4 Nation-building

The past few centuries have been politically tumultuous for much of the Himalaya, as boundaries have changed and great nations have been formed. Even today, national sovereignty is far from secure and many of the remote areas of the Himalaya remain in dispute; in some of these areas, wildlife and forests have suffered greatly.

In the process of nation-building, villagers in remote areas were influenced by development projects designed by the central government. Surpluses, if produced, used to be redistributed locally; are used instead to pay taxes or otherwise contribute to the central economy. Local self-sufficiency at a subsistence level has been replaced by national interdependence at a somewhat higher level of productivity, which has often required that resources – including forests, wildlife, and soils – be used at an increased rate and that higher inputs of energy be consumed.

Schools, improved medical care, transport, radio, a common language, hydro-electricity, and other influences have brought even the most remote areas into the nation, in both an economic and an ecological sense. What were once locally self-sufficient and sustainable human ecosystems have become part of much larger national and global human ecosystems whose productivity is impressive but whose long-term sustainability is far from proven.

2.5 Conclusions

Traditional ways of life allowed the village people to live in reasonable equilibrium with their environment, and to earn a reasonable living in doing so, though not without great hardship. Modern influences are undeniably making them wealthier and enabling the population to increase through improved medical care, security, food supply, and opportunities for migration. However, these influences are also encouraging land-use practices which are unsustainable, especially deforestation, use of unsuitable land for agriculture, and over-hunting.

The mid-20th century period of nation-building necessarily involved strengthening central governments. But the late-20th century period of building ecologically and economically viable nations will require more sensitive and productive relations with local people and local ecosystems.

In short, the need is for new cultural means of controlling over-exploitation of forests, land and wildlife. These cultural means need to be based on ecological, political and economic reality.

3. CONSERVATION FOR DEVELOPMENT

This Workshop is about the management of protected areas. But I hope that my paper has shown that any conservation measure in the Himalaya must be part of the cultural fabric if it is to make its necessary contribution to human welfare. Protected areas cannot exist in isolation.

Numerous definitions of Himalayan problems exist, along with sufficient guidelines for improving environmental management (see, for example, Eckholm, 1975; Negi, 1982; Cool, 1978; Jest, 1978; Lall, 1981; IUCN, 1980; Schaller, 1977; Dasmann and Poore, 1979; Dasmann, Milton, and Freeman, 1973; plus dozens of reports from governments, UN agencies, and bilateral development agencies). Adequate information exists to enable a far more harmonious balance between man and nature in the Himalaya.

What has been lacking has been the political will of many governments to mobilise the resources – human, financial, cultural, and moral – to ensure the integration of ecological principles with economic development. The more powerful government departments tend to be those which are producing income for the national coffers, and they have a vested interest in maximising short-term gains even at the cost of long-term environmental degradation. (It should be pointed out that this problem is not unique to the Himalayan region, but that the environmental conditions in these mountains are so critical that urgent, even radical, action is especially required here.)

The following principles are designed to help convince governments that integrating conservation with development in Himalayan cultures is both relatively painless and likely to lead to enhanced benefits to the community, the nation, and the world:

1. *Build upon the foundations of the local culture.*

Very often, cultural elements are already available for contributing to conservation. Any laws or regulations emanating from central governments should be adapted to take advantage of local predispositions, as in the case of the Sherpa *shing-i-nawa*. Make use of traditional cultural approaches to species conservation, and try to rekindle these where possible. Cultural diversity parallels ecological diversity, and local traditional adaptations are often the most environmentally sound.

2. *Link government development programmes with conservation.*

First priority for providing schools, health centres, family planning programmes, agricultural development, small hydro-electric facilities, improved communications, and other desired developments should go to villages which are closest to protected areas and other landscapes with species important for conservation. Make sure that the local villagers know that these benefits are flowing to them because of their proximity to a protected area or species of particular value to the nation, and because of their

support for the conservation of the living resources in the area.

3. *Give priority to small-scale local development.*

Mega-projects, such as major dams, may be attractive to donor agencies but they are unlikely to bring widely-dispersed benefits. The geological conditions in the Himalaya are in any case generally unsuitable for most mega-projects. It is far better to concentrate at the village level, with customised development projects which can enhance productivity of the best soils and provide local sources of energy; such development can be coupled with strong regulations to reduce human impact on steep slopes and wildlife.

4. *Give local people responsibility.*

As in Bhutan, local development priorities should be debated in village and district councils, and development projects should be at least partially funded locally. Long-term cultural stability in the past has shown that local people are fully able and competent to enforce regulations for the benefit of their community. In some areas it would be possible to establish management units under the control of local village councils; and local people should serve on the advisory board of each protected area. A key point is that local responsibility should follow local institutional patterns, and that it is better to strengthen local institutions than to create new ones.

5. *Hire local people.*

While some civil services may have educational requirements that mountain villagers have difficulty in meeting, local people should nonetheless be hired for work in protected areas in their region; Nepal's Sagarmatha National Park, where many of the staff are Sherpas, is an excellent example of this principle.

6. *Involve local people in preparing management plans.*

The preparation of management plans need not be a specialised task requiring major outside expertise; but each protected area should have a management plan, and the plan is most likely to be effective if it is developed in close collaboration with the local people (see Thorsell, this volume).

7. *Examine the options for protection of species and ecosystems.*

In some cases, species can be best protected by simply providing a game guard in the highest village, without any declaration of a protected area. And even when a protected area is required, there are many levels of protection and permissible human uses (see McNeely, this volume, for further discussion of this point).

8. *Have the courage to enforce restrictions.*

Once it has been agreed with the local people that certain restrictions (which may be those which existed when the local culture was still intact) are desirable, the regulations need to be strictly and equitably enforced. There is no need to apologise for any restrictions that may

be necessary; people have always had to live with restrictions on their behaviour, and letting people destroy a protection forest because "they have always been able to cut trees" is destructive to the community at large. Enforcement should, whenever possible, be administered by local people, and at least a portion of any fines should go back to the village.

9. *Provide viable alternatives.*

If basic changes in the pattern of living of traditional subsistence farming and grazing communities in the hills are to be facilitated, attractive and meaningful economic alternatives must be made available to hill people. Tourism, if carefully planned and controlled, can provide one such alternative and has already led to a great increase in Sherpa income (though this is not without problems, as discussed above).

10. *Launch a major soil and forest conservation campaign.*

Based on the above general principles, and a detailed examination of current land tenure and use, central and provincial governments should provide all possible support to local soil and forest conservation efforts. Only by removing human pressure from marginal lands can such areas be expected to contribute to watershed protection, forest production, wildlife and the other goods and services of conservation.

11. *Build conservation into the evolving new national cultures.*

Traditional people throughout the world have developed ways and means of conservation which are interwoven into their cultural fabric (see McNeely and Pitt, 1984, for a series of case studies). As nations are built, literacy becomes widespread, mass media become more effective, and new cultures are formed; conservation needs to become part of every possible section of the national development process and thereby become part of the new national culture rather than just a discrete responsibility of a wildlife or national parks department. It is worthy of note that the Himalayan country with the best forest cover is a kingdom with a long independent history and a culture which is deeply conservation-oriented: Bhutan.

12. *Go with diversity.*

Himalayan peoples have long recognised that diversity is the key to their survival, using a wide range of means to wrest a living from a reluctant environment. Mixed systems, transhumance, terraces, agroforestry, local varieties, hunting and fishing, and the forestry/agriculture/wilderness interface are essential to Himalayan cultures. This diversity needs to be maintained as a matter of highest importance. What works in one place won't necessarily work in the next valley, and small countries have different imperatives than large ones. A series of local adaptations based on local cultural diversity is required, not a "universal elixir" to solve all conservation problems.

In order to put these broad principles into action, I would like to conclude by making a few specific recommendations for integrating human concerns into protected area management. I realise that I am speaking in some ignorance of recent developments in the Himalaya, so I hope that many of these have already been considered, if not implemented.

Recommended action at the national level:

- Each nation should review its protected area and species management policies and legislation to ensure that human concerns are being appropriately dealt with, and that conservation is integrated into other development concerns. National conservation strategies, such as those being prepared in Nepal and Pakistan, can be an effective means of coming to grips with the problems of integrating people, conservation, and development.
- Research on traditional means of conservation needs to be carried out as a very high priority, before these cultural elements are washed away with the tide of modernism. Universities could be enlisted in this effort, and ICIMOD would be an entirely appropriate repository of this knowledge. The traditional means of conservation also need to be put into forms which would be useful to development planners and to protected area managers; workshops should be held to train resource managers to be sensitive to cultural means of conservation and to collaborate productively with local people.
- Develop national tourism policies which promote appropriate behaviour by tourists, promote equitable distribution of the benefits of tourism, and control the negative aspects of tourism. Trekkers and expedition members should be made aware of acceptable norms of behaviour, following the example of "The Kathmandu Declaration" of the International Union of Alpine Associations. Organise training workshops on development and management of wildlife recreation for tourism development corporations, national parks, and tourist offices.
- Promote awareness on the part of the urban public and government officials that what is happening in the remote mountains is of direct interest to their own well-being. Such awareness may well be a prerequisite for mobilising the resources needed to address the environmental problems of the mountains.
- Develop and package sound and convincing arguments which demonstrate that protecting critical natural areas helps support food production outside these areas, through such means as watershed

protection, soil formation, micro-climate amelioration, genetic resources, and animal husbandry on marginal lands.

Recommended action at the local level:

- Develop a management planning process which includes workshops held in the protected area concerned and involves both the local people and the local protected area manager. This workshop might nominate a few areas which would be suitable for such treatment.
- Develop a demonstration protected area which shows how benefits can flow from the area to the local people; the Annapurna National Park project proposed by the King Mahendra Trust would be ideal for this purpose as the institutional structure is sufficiently flexible to incorporate innovative management techniques.

There are of course many more detailed recommendations which could be made. The Corbett Action Plan, prepared by the members of IUCN's Commission on Na-

tional Parks and Protected Areas earlier this year, is a good example of the kind of recommendations which can help guide those responsible for managing protected areas, and provide guidance for the international agencies whose mandate includes support for conservation. I hope and expect that this Workshop will also come up with a number of specific recommendations on what is required in order to ensure that conservation yields sustainable benefits for human society.

ACKNOWLEDGEMENTS

This paper is based on lessons learned during field-work conducted from 1972 to 1974 in the Arun Valley of eastern Nepal, with sponsorship from the Field Museum of Natural History, Bill and Beryl Eddy, USNAMRU-3, the University of Iowa, Missouri Botanical Garden, Harvard University, Yale University, William and Jan Street, Howard Emery, and the Association for the Conservation of Wildlife (Thailand). The paper greatly benefitted from comments by a number of colleagues at IUCN, including Delmar Blasco, Patrick Dugan, Mark Halle, Ole Hamann, Taghi Farvar, Kenton Miller, Jeff Sayer, and Jim Thorsell.

Population Changes in the Hindu Kush - Himalaya with Reference to National Parks and Protected Areas

Corneille Jest

ABSTRACT. *In the last three decades the Hindu Kush-Himalaya region has suffered changes of unprecedented magnitude. The doubling of the region's population was matched by greatly increased demand for agricultural land, firewood and pasture. The introduction of development schemes, such as the expansion of roads into hitherto trackless areas or hydro-electric projects, has added its load to the ecological imbalance. As the population of the region is likely to double in less than another twenty-five years, the only hope for protecting the remaining natural and cultural resources of the Hindu Kush-Himalaya is to firmly orient any further development programmes toward resource and population conservation. This paper illustrates the need for this imperative by examining population growth pressure in relation to the protected areas.*

1. INTRODUCTION

There is worldwide concern over the unprecedented pace of alteration of natural environments. Agricultural development, urban and industrial growth and water management projects have destroyed extensive natural areas and have jeopardised the survival of many species.

During the past four years, two major conferences, the World Congress on National Parks in Bali (Indonesia), in October 1982, and the Biosphere Reserves Congress in Minsk (USSR) in September 1983, have stressed the urgent need for the expansion of conservation on a worldwide basis.

It is not up to us to present "new" ideas or to reinvent the wheel of Nature and Culture, but once more to summarise the facts and explore this problem from within the Hindu Kush-Himalaya region. This is a region that is unique in both its splendid beauty and its daunting challenges. In addition, it is a region where there is still potential for the development of protected areas.

Protected areas, as defined by IUCN, were designed to contribute to life support systems, and consequently to preserve genetic diversity, to promote the sustainable utilisation of species and ecosystems, to conserve the natural

heritage, and to allow for recreation and tourism. We gather here, fifty years after the formal establishment of the first protected area in the region, to evaluate our proximity to these goals and to identify innovative strategies for reaching them.

2. SETTING THE SCENE

The Hindu Kush-Himalaya region is the world's largest mountain system, covering an area of more than 4 million sq km. It extends over 2,700 km in length (66 to 102 degree longitude east). The region can be divided roughly into four latitudinal or parallel zones from north to south:

- the high Tibetan Plateau at an altitude of more than 4,000 m which hosts the upper reaches of the Indus, Brahmaputra, Salween and Mekong rivers;
- the great Hindu Kush-Himalaya range with an average altitude of 5,000 to 8,000 m, most of which is under perpetual snow;
- the lower Himalaya with peaks rising up to 5,000 m and valleys as low as 600 m; this is approximately seventy km wide; and
- the outer Himalaya, a belt ten to fifty km wide descending from 1,500 m into flat valleys which are now densely populated.

The mountain range protects the plains in the south from the cold northern winds and at the same time deflects the northwest monsoon moving along the southern face. Its snow and glaciers provide abundant water resources.

Each of these zones has its own pattern of flora and fauna. Extensive steppe-like pastures are found in the Tibetan Plateau and dense alpine and sub-alpine forests occupy the slopes of the great Himalaya below 4,000 m. The lesser Himalaya has a climate which is somewhat more conducive to agriculture and human habitation.

The outer Himalaya which is partly forested used to be an inhospitable area. With the control of malaria (in Nepal eradication dates from 1954) large numbers of

migrants from both the south and the hills settled in this zone.

The Hindu Kush-Himalaya can also be divided into a series of transverse longitudinal zones. The eastern part of the Himalaya has a prolonged rainy season from June to October, with copious rainfall which produces between 2,500 and 5,000 mm of precipitation in one year. The western part of the region on the other hand has a short summer rainy season from July to August and a fairly long winter wet season from November to April. In the central part, the average yearly precipitation is between 2,000 and 2,500 mm.

The Brahmaputra flows from the Tibetan Plateau, to the Bay of Bengal draining some 580,000 sq km. The Ganga drains away from the Himalaya to the southeast, with a total catchment area of 861,000 sq km. The Indus rises in Tibet, northwest of Nepal, and breaks through the Himalayan range and flows into the Arabian Sea (catchment area 1,165,000 sq km). Each of these river systems has moved a huge quantity of material to create the Indo-Gangetic Plains, which include some of the most heavily populated areas in the world.

3. THE POPULATIONS OF THE HINDU KUSH-HIMALAYA REGION

3.1 *An historical overview*

The Hindu Kush-Himalaya region is a social and cultural interface. The northernmost high altitude regions are predominantly Tibetan throughout their length from Ladakh to Bhutan, Arunachal Pradesh, Western Yunnan and Sichuan. The southernmost low altitude regions are predominantly south Asian/Indian. As one goes further east the influence of Southeast Asian traditions and populations increase. The farther west one goes the more conspicuous is the influence of Southwestern Asian cultures and people. Evidence of these cultural variations is to be found in a rainbow of languages, social customs, religions and economies.

There are significant cultural variations too within each sector perpetuated by the difficulty of communication in a rugged mountain terrain. On the other hand there is a notable degree of cultural continuity throughout the region between comparable ecological zones. Above all, every sector in the region has to live with its basic natural resources and their growing shortages. Therefore, the separate problems faced by each part of the Hindu Kush-Himalaya are but different facets of the same core issues of resource management.

The region is also populated by a mosaic of ethnic groups within the context of larger political structures. Some are cultural minorities on the economic and political fringe of a dominant national society, and it happens that most of the protected areas are located in their neighbourhoods.

These cultural minorities live in small-scale societies with a common territory, and their subsistence livelihood is based on kinship and customary rights and obligations. Sharing ancestral property, members of these traditional societies maintain strong cultural ties with their land and claim exclusive rights to it and its resources. Language, religious beliefs, culture and history are often different from those of the nations within which they reside, especially in remote areas of Bhutan, Arunachal Pradesh and Burma.

Over the centuries the mountain regions have also experienced the vicissitudes of population inflow and outflow, as people of the plains have sought refuge in the hills from invaders, exploiters, competitors, famine and epidemics and those in the hills have also fled from occasional conflicts. People have more recently emigrated to pursue the presumed rewards of the cities in the plains. The political history of the mountain regions has been primarily one of feudal states, petty kingdoms and occasional incorporation of local entities into larger political units. Thus regional and temporal disparities, in political and economic organisation, in prosperity, in population density and in resource utilisation has ample precedent.

3.2 *Uneven population distribution and density*

The geographical analysis of population brings out the important relationships between man and habitat. Vertical stratification of the environment is the chief characteristic of the region, and distribution of population varies within these strata. Altitude, slope, ecology and availability of water are factors of the physical environment which have also influenced the distribution of population. Using the density factor one can distinguish two major zones:

- Above the 300 m contour line from east to west, there are a series of districts of Sichuan and Yunnan, Arunachal Pradesh, Bhutan, Sikkim, the high valleys of Nepal, Uttar Pradesh, Himachal Pradesh, Kashmir and the N.W.F.P., in which the density does not exceed 10 to 20 inhabitants per sq km. The settlements are often of an oasis type, especially where water is the limiting factor.
- Below 2,000 m (approximately the upper limit of rice-cultivation) the population density is high; it can reach 1,000 inhabitants per sq km of cultivated land in the case of Nepal, and 700 inhabitants per sq km in the hill districts of Uttar Pradesh, India (Tejwani, 1982). On the other hand, there is occasionally even an absence of pressure which can be due to political decisions, such as in Arunachal Pradesh where the "Inner Line" protects the region from encroachment.

In some instances resettlement of people has been used as a solution to the uneven distribution of population and resources. It is inevitable that such uprooting has

caused great stress and even destruction of traditional societies.

3.3 Resources available to the mountain populations

Soil is the basis of agricultural enterprise and the need for conserving soil cannot be over-emphasised. As a result of erosion, valuable top soil is lost, and fertility is depleted, resulting in poorer yields. In the higher valleys where water is scarce, most of the human settlements are established on alluvial terraces. Forests play an important role in the supply of necessary raw material to support life.

“Traditional agriculture” is characterised by a diversity of cultural adaptations to local conditions. The labour input is high, the family is the production unit; there is very low capital investment. Energy is provided by man and animals and there is a little dependence on the community. In the agricultural lands of most parts of the region people live at subsistence level.

In the case of the upper midlands of the Himalaya, a number of distinct ethnic groups still live on a subsistence economy basis practising buckwheat and dry rice cultivation and hunting. Land, water and forests were thought of as common property husbanded by a community or a clan (for example, among the Tamang of Nepal). In addition, elaborate systems permitted multiple use of resource systems by different groups. The management of the systems has been disrupted by the gradual privatisation of the land.

Cattle are not usually considered as either a population or a natural resource, but they are such a major factor in the region that they must be considered as an intermediate resource. Cattle are the main source of power for cultivation and transport, and their contribution to the food supply is not negligible either.

Cattle are very unevenly distributed between the four major latitudinal physical divisions of the regions. Pastoralism is practised extensively. In the higher zone and the Tibetan Plateau small groups of shepherds move their herds to the most suitable pasture grounds from the lowlands to the highlands in a yearly cycle. The pressure of cattle is by far the highest in the hills; figures supplied by the Uttar Pradesh Department of Forests show that “in Kumaon . . . about 20,000 sq km are actually available for grazing by about 4 million cattle. This huge number of half-starved and stunted cattle gives a pasture loading that is at least ten times greater than hill pastures can sustain without deterioration”.

4. THREE DECADES OF CHANGE

The natural systems worked for millenia with very limited interference from man. This minimal pace of change increased dramatically after World War II, as the relationship between man and his mountain environment

was transformed from “natural” or “within a given equilibrium” to “artificial” or “forced”. This was primarily due to geopolitical reasons and related rapid growth of human and animal populations.

Enormous physical transformation has taken place during the past three decades. More than 10,000 km of roads have been built in the Central Himalayan sector. Mule trails and airstrips have appeared which have expanded the goods transfer and communication networks. Dams have been built for the supply of energy.

4.1 Change in population

In the last thirty years Asia has doubled its population. The effects of that doubling on the environment are easy to see but the implications are complex and not fully understood. The changing economics and social arrangements have made it difficult for rural people to have access to the basic agricultural resources upon which they depended. The growth of the cities is, of course, an integral part of the population problem of the region, but we address here not the internal city populations but rather the effect of the urban areas on the majority (85 per cent) of the population which is still rural.

It must be underlined that the population continues to *grow at a rate of 2.5 per cent per annum*. The population size of Asia is expected to double again by the year 2010 – only another twenty-five years! In the case of Nepal the total population doubled from 8.4 million in 1952/1954 to 15 million in 1981. A modest projection of the total population by the year 2001 is estimated at 25 million (H. Gurung, 1984).

The hill region has seen a large absolute increase over the three-decade period, but the Terai population doubled during the last two decades (1961-1981) and the percentage of total population increased from 36.3 per cent in 1961 to 48.8 per cent in 1981. Only the mountain districts show a declining growth rate. In the case of the Indian mountain region, there were 11.9 million inhabitants in the western part of the Himalaya (Census of India 1971), with an average of 78 inhabitants per sq km. From 1901 to 1961 the rate of increase was 1.1 per cent per year in Himachal Pradesh, but from 1961 to 1971 the rate of increase rose to 2.4 per cent per year in the same state; in Uttar Pradesh this rate was 3.5 per cent for the same period (G. Singh 1978). The population remains predominantly rural, including summer resorts and army cantonments. The population of cattle is four times that of humans and is increasing fast. This population growth has led to a sometimes drastic over-exploitation of natural resources.

Population pressure is difficult to define but most of the region, by any conceivable definition, can be seen to be suffering from it. An average family that a generation ago had a hectare to live on now has only half a hectare. It might have been conceivable that the region could have been either a centre for invention of new adaptive

technologies or at least very receptive to new ideas coming from outside (family planning being one of them). However, this is not the case, and it would seem that the inhabitants of the Hindu Kush-Himalaya region have often "adapted" culturally rather than technologically.

The deterioration of living conditions in the mountain region caused by population growth is causing emigration. Since the more enterprising members of the community often leave first, the aged and less active population is left behind. Another consequence is that in the lowlands illegal squatting causes an additional threat to the land.

Tourism in its modern sense (the Himalaya have been for centuries a place of pilgrimage) is an addition to the population movement. On the positive side it brings income and in fact encourages preservation of both natural and cultural heritage. But it must also be seen in light of the negative impacts that it can have on populations, including encouraging the trends towards commercialisation of culture; competition for the use of scarce resources (as in the case of fuelwood in the national parks); and introduction of alien values.

4.2 *More pressure on the resource base*

Overpopulation of an area starts an insidious spiral of diminishing returns from the resource base. With increasing population the farmers must turn to previously uncultivated lands which are more susceptible to erosion. As they erode, their fertility decreases, which adds to the pressure to bring more marginal land under cultivation. Marginal lands were traditionally assigned to livestock grazing. The growth of the human population is accompanied by a growth in livestock, at the same time that fodder resources are disappearing. More people need more housing and they turn to the forests for construction materials and fuel. All this leads to an over-exploitation of forests resulting in deforestation which increases the likelihood of erosion. With the increase of population and industrialisation, the water supply, although made more easily available, diminishes. In deforested areas, surface water infiltrates poorly and runoff increases in amount and speed. Streams become polluted; badly controlled flows have created eutrophication of the lakes (such as the lakes in Srinagar, Kashmir); siltation increases and even the water-tables are being affected.

The consequence is a more erratic water regime because the total water storing capacity of the mountain region is reduced, floods become more frequent and the siltation of reservoirs becomes the norm. For the people in the highlands, this process threatens the most dramatic consequences since their very subsistence is endangered as the resource base drains away. These people either have to migrate (and this always results in hardship) or it will become increasingly difficult for them to eke out a living. The levels of poverty and malnutrition in the highlands are very high.

Elaborated farming systems had traditionally evolved which permitted multiple use of the resource base by

groups with different needs at different times during the agricultural cycle. Cattle breeders spending the summer at high altitude would winter on the lowland fields and fertilise them. Less winter grazing areas are available as second cropping has been introduced to meet the immediate food shortage.

The pressure on the flora and fauna is also a consequence of the increase in population. Some medicinal plants have been gathered almost to the point of extinction. The same could be said for the poaching of certain animals for fur or medicinal products, e.g. musk deer, bear and rhinoceros.

4.3 *The socio-political dimension in change*

All the countries of the region have experienced great changes in their social and political structure, economic life and cultural values during the past three decades. Nations were born and discovered their identities. The mosaic of ethnic groups of different origins, cultures and religions which comprised the traditional societies were to a large extent hierarchical. They were not "democratic" in the modern sense, but they did give to each individual a role with status and rights — whether positive or negative — of participation.

Although there were social constraints limiting the exercise of power, the concept of reciprocity imposed responsibility on those who controlled resources to share the products of those resources at regular intervals (for example, through rituals, sacrifices, and ceremonies).

Furthermore the past administration was organised in small territorial units with dispersed leadership and roles for young people to aspire to. With the advent of centralisation these positions were lost or diminished and many people who were the original intellectual resources migrated to the decision-making centres in the cities.

With this specific attribution and general population increase during the past three decades we have seen the destruction of traditional social organisation and the emergence of a "new" class of people who have not been assured stable social and economic roles in rural society. The number of "landless" people is growing rapidly and this certainly will affect the economic and political stability in the near future.

The reaction of different ethnic groups to political and economic events impinging on their traditional social and political structure suggests the great variety of adjustments to change. These adjustments may bring about a disintegration of the social order or they may induce a population to pull together and overcome difficulties by a heightened sense of co-operation and identity.

4.4 *The concept of protected areas*

In thinking of protected areas one should recall a larger perspective where for centuries, religious tradition

protected nature. In the case of Nepal, forests such as the ones in Pashupati, Surya Vinayak or Vajra Varahi were considered sacred; animals dedicated to divinities were not slaughtered.

Some of the protected areas in the Indian sub-continent were originally hunting reserves. The first national park in the region (Corbett) was established in 1935 in the foothills of the Himalaya; except for a few parks on the edge of the mountainous areas all the other protected areas have been established after 1950.

The creation of the early protected areas was a bold experimental step made in reaction to critically felt needs. These needs are now being understood as much more complex and it is time for more bold experiments aimed at integrating protected areas with local communities. In 1975 it was realised that without immediate action some of Nepal's most valuable natural resources would not survive. A scheme of conservation areas was drawn up and put into operation, based on information already available. Three large and ecologically representative areas were selected and designated as national parks in the Western (Lake Rara), Central (Langtang) and Eastern Himalaya (Sagarmatha).

5. THE NEXT THREE DECADES

Given the example of the past thirty years can one expect reform or fundamental changes? If there is a hope it lies in the direction of community control of resources. This concept has been sanctioned by the Nepal Decentralisation Act (1984).

One must extrapolate from the experience of the past three decades and conclude that unless decisive actions are taken the ecological system of the highlands and lowlands will reach the stage of irreversible collapse by the end of the next thirty years.

Important questions arise from the fact that one is hard pressed to make specific recommendations for controlling the process of change. There is little good or complete documentation concerning the problems of mountain development or about the quantitative impacts of "negative" actions.

What can we do about this? How can we expand our information base? At what level can protected areas play a role? What role can local communities play in the gathering of information?

In an average of 20 to 25 years the population will double in all the countries of the region, except China. It is imperative to think about the consequences of such a second doubling of population in order to foresee the possible solutions and not to wait. Our challenge is now to relate a larger population to "inelastic" resource systems in ways which assure access to productive resources by poor and eventually landless people.

The power and control over resources internally has been taken out of the hands of traditional groups and settled on the bureaucrats in the lowlands. It can be assumed that they do not see or understand the problems of the highlands.

What structural changes are possible? Can we, as committed decision makers, devise alternative patterns which permit increasing numbers of people to participate in the management of the productive resources as well as the conservation resources such as the Protected Areas? There is a strong growing desire to maintain economic and ecological stability and to preserve cultural tradition, so we should try to relate these facts to our concern for the development of protected areas. Conservation and return to traditional social organisation in co-ordination with appropriate new technologies is the challenge that the region has a unique opportunity to meet.

5.1 *The future of protected areas*

The Indian Board for Wildlife included an insightful clause in its definition of National Parks: "an area dedicated by statute for all time to come, to conserve wildlife therein and to provide for the enjoyment of future generations with such modification as local conditions may demand." We are now at that point of refining the understanding of the various local conditions. In the recent working session of IUCN's Commission on National Parks and Protected Areas in Corbett (India) in February 1985 it was stated that "the major threats to the continuation of the protected areas of the nation come not from within the areas but from human pressures outside. It is to these threats that conservationists must increasingly address themselves. Conservation must no longer be an alienation of rights of the rural people but a positive factor in the long-term development of their environment."

We have here a valuable opportunity for the countries with established protected areas and the countries about to establish them (Bangladesh, Burma, China) at the mountain perimeter to learn from each other. This workshop should help to place the region's socio-economic development within a global conservation strategy.

The World Congress on National Parks in Bali provided guidelines that should enable protected areas to meet the needs of the 1980s. Among them, objective 5 is to "promote the linkage between protected area management and sustainable development; investigate and utilise the traditional wisdom of communities affected by conservation measures, including implementation of joint management arrangements between protected area authorities and societies which have traditionally managed resources."

Protected area managers must be fully conscious that these areas are not isolated zones, but they are part of a larger ecosystem and they are part of local people's lives albeit in restricted ways. The birth of the protected areas was in some cases painful. No doubt some of our

participants bear the scars. But at least because of their shared experiences park management and local communities have become familiar with each other, so perhaps now constructive co-operation can proceed.

In practice, very few measures have been taken to involve the local populations or to positively link their activities and needs with conservation. One has to recognise the difficulty of changing the present protectionist approach into one which effectively involves the local communities from the inception of a given project. Rural conservation will require communication, education and management of the traditional techno-economy (taking into account the social organisation and the culture of a given region). Successful conservation will mean improving the welfare of those who are ultimately the wardens of Nature.

Assumptions which a development strategy should consider include:

- the Hindu Kush-Himalaya region is ecologically fragile and biologically not very productive;
- the exploration of energy resources has not yet been completed and the cost of potential energy resources may be high;
- the population exceeds, in most cases, the natural carrying capacity of the region;
- precise data is needed to increase awareness at policy making and decision making levels;
- there must be recognition of environmental destabilisation as an international problem which requires co-ordination and planning between all involved parties.

An important step can be taken to develop research planning and action so as to prevent the further destruction of natural resources. Since the growth of the population is the major source of this destruction, control of population growth and the planning of settlements in size and location constitute the base of this programme. Family planning programmes have not yet had a significant effect on the region.

6. CONCLUSIONS

"The challenge is to ensure the prudent management and conservation of the Himalayan mountain environment so that not only the endangered flora and fauna but an increasingly larger human population may continue to live in compatibility with the mountains." This caution has been expressed by John Cool, an eminent specialist in population studies (Cool 1978).

The Hindu Kush-Himalaya ecosystems are very fragile and the maintenance of their character is necessary for the welfare of the generations to come. People and decision makers must develop an awareness of their natural resources and of the dangers which threaten them.

The problems of population pressure in the region are too important to allow for a sectorial approach to their solution. An integrated approach should promote both development and environmental protection. In the whole region the most crucial economic problems lie in the hills (500 to 2,500 m). It is there that the problem of poverty has to be tackled and this will require development inputs and economic incentives.

The Hindu Kush-Himalaya environmental problem is *transnational in character* and can only be solved with active participation and collaboration at regional as well as national levels.

Any plan or programme of protected area development must involve the management of change, and the most crucial, albeit difficult type of change is that of human behaviour. This consideration has been lacking in the current management process. It is time that it be included.

The concern of conservation is that of the relationship between population, resources and environment. This can be studied by concentrating either upon the relationships between population, resources and technology or upon the relationships between social organisation, values and associated lifestyles. Whatever theme is explored, the framework should help us to see how individuals and groups perceive their surroundings and hence, within the limits of their technical tools, what their options are.

The institutions responsible for planning must actively test innovative programmes. Examples of socially based conflicts over natural resources should be analysed. Social structural reforms might be considered. The concerns of the mountain people must be better understood, their consciousness about the protected areas raised and their educational levels and organisational skills enhanced. The aim must be that the local community control the resource systems.

Major challenges confront the planners and decision-makers because government goals may not always coincide with the interests of the inhabitants of the region.

Communities may not be socially receptive to the plans, however much they may be for their own good. A major problem is that the community may know what they do not like and what they want, but they are very seldom organised to the extent that they can participate in co-ordinated strategy and priority formation, much less compromise.

Past experience shows that too much harm has been done because advice has come from the outside. For protected area management to struggle with the local communities effectively may first mean helping them to organise themselves for the struggle.

ACKNOWLEDGEMENTS

Many of the ideas expressed in this paper have developed through contacts with UNESCO's Man and the Biosphere Programme, IUCN and the members of ICIMOD.

Some Principles for Resolving Conflicts About Protected Areas

Chandra P. Gorkhali

ABSTRACT. *Protected areas by their very nature proscribe certain uses of the resources being protected, and such restrictions can often cause conflicts with the people who would like to use – and abuse – the protected resources. This paper outlines some of the principles of conflict, including conflicts about facts, values, and relationships. It concludes with a few thoughts about how conflict resolution can help to improve relations between local people and protected areas.*

1. INTRODUCTION

The establishment and administration of national parks and wildlife reserves is an important part of conserving the natural environment. As in many other spheres of development, it is found that there often exists a genuine conflict of interest between the various parties involved. Whereas, on the one hand, these parks and reserves are expected to serve the aesthetic, ecological and long-term economic goals of environmental conservation, the local people might perceive that protected areas threaten their own short-term economic progress and socio-cultural well-being. While there is a need to protect the area against any further damage, the interests of the local people should never be neglected. Such conflicts of interest are, moreover, often amenable to resolution. It should not always be necessary for government to intervene by enforcing heavy-handed laws. Instead we should try to bring about a conscious change in lifestyle through proper education. Hence, it is necessary that the government acquire and adopt the necessary skills to resolve these conflicts.

2. THE ROLE OF CONFLICT IN SOCIETY

Political scientists believe that any genuine conflict of interest acts as a necessary “escape valve”, which can lead to evolutionary change in the society itself. Conflicts help us to perceive accurately the interests of diverse parties and thus, to establish group identity. Kenneth Boulding has identified conflict resolution as a “learning process” since it gives us an opportunity to learn the skills of negotiation and agreement. We also often learn the real self-interest of the respective parties.

We should also be aware that some conflicts can become so exaggerated that a situation becomes dysfunctional. Decision-makers can play an important role in determining the outcome of any conflict, but all too often the decision-maker sees a conflict as an impediment to progress. It is easy to imagine a conflict situation getting out of control and thus beyond any individual intervention. Since any decision-maker would like to feel himself in adequate control of events, conflicts can become a threat to this adequacy. In such a case, one tends to avoid conflict situations or, if they cannot be avoided, attempts to “keep the lid on”. Both these responses tend to encourage dysfunctional conflict. Neither response leads to resolution and consequently there is either an increased urgency for the parties to press their demands or the conflict goes “underground”. Hence, the answer lies not in avoiding conflict, but in acquiring the necessary skills to make a significant contribution to conflict resolution.

3. CATEGORIES OF CONFLICT

3.1 *Cognitive conflict*

The government and the people may have different perspectives regarding the facts of the case. Arguments concerning facts are often put forward as conflicts of values or interest. Therefore, actual cognitive elements or facts are not always distinguishable from values or interest.

3.2 *Conflict in values or goals*

Parties with different values have fundamentally different perspectives from which they evaluate a proposed action. Sometimes value conflicts are difficult to distinguish from cognitive or interest conflicts. People tend to support their values and they also tend to adopt values which are consistent with their interests. In short, values and interests are inter-related so far as human behaviour is concerned. An interest conflict arises mainly because of the economic costs and benefits arising from the action. Since these are rarely distributed equally, some parties will have a greater interest than others in the proposed action.

Others may have an interest in assuring that it does not occur. Thus, whereas both parties might agree about facts and values, they may still have conflicts that are based on their interests. A national park or wildlife reserve project may be ardently supported by the government, as it will protect the biota and land from further damage or deterioration, but the local people may oppose it, if they feel the park is not in their self-interest.

3.3 Relationship conflicts

These conflicts arise from emotional motivations, concerning the personality factors involved in conflicts. One group may feel insulted or challenged by another one. A group may feel resentful that it was not consulted. When a decision favours only those groups which are well-financed and organised, to present scientific data, and neglects those who primarily argue from a value base, conflicts of relationship arise. When emotional reactions emerge on the scene, dysfunctional conflict is often inevitable. For example, when a group emotionally defines itself as "revolutionary" it will have extreme difficulty in accepting a compromise even if its apparent self-interest would dictate it. Many groups react to government actions simply on the grounds of a reaction pattern internalised during youth.

Environmental conflicts are known to have arisen from all of the above sources of conflict. In the absence of an effective managerial and educational programme, fundamental value differences have occurred between local people and the State concerning the national parks and wildlife reserve programme. The local people have opposed the environmental programme, as they do not agree with the "facts" of most environmental issues. Hence, there is a full range of potential bases for conflict.

4. CONFLICT RESOLUTION

Paul Weber describes five basic steps which a conflict follows, if allowed to persist without any intervention from outside. Initially the conflict is precipitated when public attention is aroused. Next, what originally began as opposition, based on ignorance of facts, subsequently becomes an issue concerning the quality of life and growth of the economy. The issue is thereby transformed and proliferated. In the third phase, the groups tend to define their positions more sharply. They will aim for internal consistency. Leaders emerge inside them and they consolidate their position by declaring a firm organisational setup. Then, as the issues change and positions become firmer, there is a tendency for the level of conflict to escalate. At this stage it becomes evident that the intervention of a third party is essential, if the conflict is to reach the last stage, resolution.

The role of an arbiter varies with the nature of the conflict. The arbiter's approach must be appropriate to the issue and the groups in question. Thus, if a conflict exists because of a difference in perspective concerning a fact, i.e. the effects of the programme, the arbiter may work with the parties to find out the "facts". Appraisal of the impacts of an action is based on this strategy. Second, if there are conflicts of values (i.e. when people disagree over goals) the very source of information will also be challenged. Each side will credit solely those sources that favour its position. The major task of a third party in such a case is to encourage the perception of long-term interest, create conditions for reciprocal farsightedness between conflicting groups and help establish processes leading to successful resolution.

Aims and Methods of Nature Conservation in the Himalayan Region

M. Numata

ABSTRACT. *This paper starts with a review of the state of natural vegetation in Eastern Nepal in the mid-sixties. It then describes various types of protected areas in Japan and the general principles and objectives of nature conservation. The relevancy of such general principles for Nepal is discussed along with the author's endeavour for the establishment of national parks in Nepal in the initial stage.*

1. INTRODUCTION

While in eastern Nepal for an ecological study in 1963, I found the destruction of the natural landscape greater than I had expected. Along the caravan route from Kathmandu to Junbesi, I found extensive areas of pasture, paddy fields, upland terraces and secondary forests. I saw cattle grazing after the paddy fields had been harvested, slash and burn agriculture, the cutting of twigs and tree leaves as fodder and grazing in the undergrowth of forests, etc. Coppices of rhododendron with beautiful flowers were remnants of forests after the first layer timbers and the third layer of dwarf bamboo had been used. Fields of primula were the result of the overgrazing of pastures. Even the alpine scrub of juniper and rhododendron was burnt to obtain tender grasses for the transhumance of yak and dzo.

After surveying and observing this kind of destruction in eastern Nepal in 1963, I submitted a report and recommendations to the Nepalese Government on the aims and methods of nature conservation. At that time, I particularly recommended the establishment of national parks and nature reserves. A paper on the vegetation and conservation of eastern Nepal was subsequently published (Numata 1966). Since then, some national parks and wildlife reserves have been established which have been introduced twice in a Japanese journal (Numata 1977, 1981). The International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya being held in Kathmandu is a unique opportunity to discuss conservation issues.

2. PROTECTED AREAS IN JAPAN

Japan is also a mountainous country, 70 per cent of which is covered with forests. There are several types of

reserved areas in Japan on national, quasi-national, prefectural and municipal levels. They range from natural monuments to nature conservation and wildlife – wilderness areas (See Table 1). These are designated and protected under law. In addition, protected forests for scientific reference are designated by regional forestry offices. Within the framework of natural monuments, big and old trees are designated initially at the individual or species level. As a rule, there are three types of protection from the standpoint of the biological levels of (1) the individual, (2) species and population, and (3) community and ecosystem.

Table 1. Categories of protected areas in Japan

Protected Areas	Status and Number
1. National Parks	National – 27 Quasi-National – 54 Prefectural – 227
2. Wilderness Areas	National – 5
3. Nature Conservation Areas	National – 9 Prefectural – 482
4. Wildlife Protection Areas	National, Prefectural
5. National Monuments	National, Prefectural, Municipal

In 1965, ten primeval forest areas in Japan were selected by the Ecological Society of Japan and were recommended as protected areas to the Government through the Science Council of Japan. This work was urgently needed as part of the rapid enforcement of controls on clear-cutting of natural forests after World War II. Recommendations on primeval forests were implemented in the form of wilderness areas by the Environmental Agency.

To identify important biota and vegetation, an urgent survey of possible natural monuments and vegetation mapping was done by the Cultural Agency. Vegetation maps at 1/200,000 scale have now been completed for all prefectures. This is the basis of the *triage* approach to the selection of important biota and vegetation. The term

triage (from the French *trier* – to sort) was once applied to war-wounded soldiers in field hospitals, in which limited medical care had to be rationed between cases in a range of severity, passing over those for whom it was considered to be too late and those who could wait. Now this macabre term has reappeared again in the very different context of plant conservation (IUCN 1984).

During the IBP (International Biological Programme) period, the CT (Conservation of Terrestrial Communities) Committee, for which the author served as the convener, selected nature reserve candidates and made a list of endangered plants and animals. The check sheets of the candidate reserves were sent to the Biological Records Centre, Monkswood, UK.

The Ecological Society of Japan next adopted the designation of secondary forests and grasslands. The secondary forests and grasslands are seral communities, and they are maintained under proper management. Even in a national park, the grassland landscape is maintained by burning, grazing, or mowing as in Aso National Park in Kyushu. Some people do not recognise the importance of such semi-natural grasslands when compared with primeval forest of *Cryptomeria japonica* on Yaku island (Yaku-Kirishima National Park). The primeval forest constitutes a special protection (strict reserve) area, but grassland is also a conservation area deserving proper use. In the latter, the grazing intensity, period and season, frequency and time of mowing, etc., should be controlled to maintain good grassland conditions. In a natural monument of insectivorous plant communities, lowering of the water table and unmowing prompted progressive plant succession, and the floristic composition of hygrophytic plants changed to that of mesophytic plants. In natural parks and/or natural monuments at seral stages, vegetation and habitat management are essential.

3. AIMS AND OBJECTIVES OF NATURE CONSERVATION

The objectives of nature conservation are largely divided into biotic and abiotic. In a broad sense, the air, water and soil as the abiotic environment of living things are also the objectives of nature conservation. However, they are mainly considered from the viewpoint of environmental pollution and degradation. Thus, the main objectives of nature conservation are plants and animals, excluding the abiotic environment. One reason for this is the preservation of species. According to a recent report (Squire 1984), 26 million ha of tropical rain forests are disappearing annually, and 15,000 to 20,000 species will disappear by 2020 A.D. in South America alone. Two-thirds of higher plants (240,000 species) are found in the tropics, and more than 10 species of animals and micro-organisms depend on just one species of plant. Therefore, the extinction of many plant species would have a great influence on the earth's ecosystem.

In Japan, the Japanese serow is designated as a special natural monument. Shortly, however, it will be changed to an aerial designation instead of a species designation because of forestry damage. If the system of species designation continues, the serow cannot be shot anywhere, but it will be shot outside of the designated area under the system of aerial designation of plant communities and ecosystems rather than individual (the designation of the plane rather than point and line becomes more important not only for climaxes but also for the seral stages).

Nature conservation is first done on the basis of a laissez-faire (non-interference) policy. Primeval forests, real climax forest and wilderness areas should be maintained without any interference. Pine forest on the volcanic lava (a seral stage of primary succession) gradually develop into a climax without interference. The coniferous forests of Hokkaido were severely destroyed by a typhoon and there were a lot of fallen trees. When we expect the natural recovery of forests after a typhoon, we should establish a principle of non-interference even if there is an outbreak of noxious insects.

Second, there is the semi-natural or semi-artificial policy. In the lowland of eastern Nepal, there is a characteristic pasture dominated by *Cynodon dactylon* and *Imperata cylindrica*. This is a so-called semi-natural pasture in accordance with Tansley's terminology. This is a naturally grown, not sown, pasture the productivity of which is not so high. However, if it is used for grazing by cattle within the carrying capacity, it maintains a sustainable yield. We must continuously apply a biotic pressure of proper use to a pasture. Such use might be grazing, mowing and/or burning. Proper use of naturally grown pasture means using a semi-natural or semi-artificial technique.

An extensive stand of *Cypripedium japonicum* was designated as a natural monument. This orchid is frequently found in the undergrowth of bamboo brakes; light condition under the canopy is suitable for the growth of the orchid. However, a stand under the canopy of *Chamaecyparis obtusa* was designated, and it gradually disappeared as the forest floor became dark. If it is desired to maintain a good growth of the orchid under the canopy of a conifer, we must conduct pruning and thinning of coniferous trees and cutting of the dwarf bamboo undergrowth. Thus, the most suitable state for orchids on the soil surface is maintained under semi-natural and semi-artificial conditions.

Third, a completely man-made policy is adopted for the conservation of street trees, man-made lakes, etc. In Japan, historical monuments of street trees consisting of old and big *Cryptomeria japonica*, planted during the Tokugawa period (1603-1867), are objects of nature conservation. Old style gardens, some consisting of beautiful man-made forests and lakes, have been designated as parts of national parks.

Fourth, the change in nature due to natural disasters should also be considered. The extension of savanna is

said to be caused by biotic factors, such as burning and overgrazing. However, the same phenomenon has occurred due to lightning, a natural disaster. A beech forest on a steep slope in the montane zone sometimes changes to a grassland due to frequent avalanches. Landslides and sheet and gully erosion denude the vegetation cover. Also, natural forests and grasslands are sometimes damaged by the flooding of a river.

The four kinds of nature conservation discussed above are the bases of vegetation or ecosystem management. Potential natural vegetation maps and isograms of the degree of succession provide useful technology for conservation.

Nature conservation in a broad sense includes: (1) preservation of natural areas such as wilderness areas and climaxes to maintain the diversity of ecosystems, (2) maintenance and management of natural resources with sustainable utilisation, such as sustained yield forestry and fisheries, the proper use of pastures within the carrying capacity, (i.e. not to be overgrazed, etc.) and (3) prevention of air, water, soil, and radioactive pollution, etc. The abovementioned cases are all designed to maintain good environmental conditions. However, even the creation of green space with trees and grasses is included in nature conservation in the broad sense. Thus, nature conservation means protection, management, control and the promotion of nature and natural resources.

The aims and methods of conservation in general, described above, are related to the author's conclusion on nature conservation in Himalayan Nepal (Numata 1966). Interest in nature conservation can be seen as a symbol of cultural development. The aims of nature conservation are considered from various points of view such as:

3.1 For scientific reasons

3.1.1

We can learn the general principles of harmony, balance and/or equilibrium in nature by the study of nature reserves. For example, there are few noxious insects and fungus or virus diseases in natural mixed forests but many in purely man-made plantations.

3.1.2

We can also find models of the natural economy there. For example, the productivity process of primeval forests is more efficient than that of managed farmland.

3.1.3

It is necessary for science and education to maintain primeval nature, biota and life zones. In Japanese mountains, plantations of *Larix kaempferi* cover a large area, but students cannot understand vertical vegetation zones of a mountain from them. Particularly if a climax forest is destroyed, it will be difficult to restore it to its original composition and physiognomy in a short time.

3.2 For aesthetic and bioethical reasons

We have a great interest in the natural beauty of primary (primeval and climax) and secondary (biotically affected and successional) nature. The former consists of climax forests, alpine grasslands, etc. while the latter consists of semi-natural pastures, marshes and bogs, etc. It is our duty to maintain such natural beauty from aesthetic and bioethical standpoints. Natural beauty is a basic characteristic of national parks as well as of wilderness areas.

3.3 For technical reasons:

3.3.1

Land will be devastated by disrupting the balance of nature. For example, inundation and soil erosion are often caused by reckless and extensive deforestation, whereas soil fertility and ground water are well maintained by a climax forest.

3.3.2

Potential natural vegetation is the basis of sound mountain development, such as forestry, cattle-raising and agriculture. The preservation of remnant primeval vegetation is important since it serves as a key for the development of potential natural vegetation maps.

3.3.3

Primeval nature is a resource for tourism and recreation. On the other hand, highways, rope-ways, etc., destroy nature during their construction phase as do exhaust fumes from cars. Forest trees are felled for the fuel of mountain hotels and mountaineering. Such human impacts are most harmful to the maintenance of primeval nature.

A special symposium of the XIth Pacific Science Congress on "The ecological basis of nature conservation in alpine and sub-alpine zones" was held at Kamaikochi in the Central Alps National Park of Japan in September of 1966. It sent a resolution to the Government on special research areas in each climatic zone for observational and experimental studies for the purpose of achieving the following three main scientific objectives:

- a) To study the processes that take place under natural conditions within such ecosystems for a better understanding, and to aid in future resource management,
- b) To preserve their natural vegetation covers as gene pools for future use through technological advances, and as breeding stock for producing new combinations, and
- c) To use these untouched ecosystem areas as controls against areas now under intensive management.

The methods of nature conservation related to the several aims mentioned above are as follows:

- i) **Strict reservation:** the climax ecosystem must be reserved without any management or control.
- ii) **Management:** a constant feature of a successional stage, such as semi-natural pastures, will be maintained by suitable management or control, i.e. constant biotic pressure.
- iii) **Size and shape of a reserve, strict or management reserve:** a forest reserve area is said to require more than 1,000 ha, including the buffer zone around the core area. The size and shape of

areas must be determined to maintain the flora and fauna, the original structure and composition of vegetation or ecosystem, and the life of large mammals. The scientific, particularly ecological, basis of these methods should be given by field surveys and theoretical considerations for various types of ecosystems.

CONCLUSION

These above-mentioned general principles for the aims and methods of nature conservation are applicable to all countries, including the Himalayan region of Nepal, when establishing national parks and nature reserves.

The Role of Environmental Education in Conserving the Himalaya

Karna Sakya

ABSTRACT. *Environmental degradation in the Himalaya has geographical, social, and political elements; the first is inevitable, but the second and third are both amenable to change through education of political leaders, students and the general public. This needs to include formal education, semi-formal education, informal education, professional education, and education for international understanding, leading to improved level of consciousness and awareness about the environment, development of improved attitudes about the environment, and finally, implementation of conservation measures. While education cannot itself solve the problems, it is a necessary part of all solutions.*

1. INTRODUCTION

The Washington Post reported that more landslides occur in Nepal than anywhere else in the world. This is not a journalistic exaggeration intended to cause a tempest in a tea cup; indeed, the reality of a harrowing abuse of nature can be observed on the Kathmandu-Pokhara road, where on one occasion more than four hundred landslides could be seen within a four-hour drive. Should such ecological disaster continue, Nepal can hardly survive. The fabric of the Himalaya, although it projects magnificent strength, is nothing more than a fragile web that has been woven delicately but is supported only by a few strands of thread, which when cut could cause the entire intricate system to fall apart. These strands of thread form our fragile mountain ecosystem.

2. SOME CAUSES OF ENVIRONMENTAL DEGRADATION

2.1 *Toothless tigers*

Ecological degradation in Nepal is not a result of a singular physical contretemps — it is an inexorable syndrome developed from socio-economical, biological and political factors. It was born of the constrained economy, triggered by myopic politics, perpetrated by a bureaucracy Byzantine in complexity and pampered by widespread illiteracy. In this sad story, human factors

both social and political play a malignant role. Physical limitations such as weather, water and soil are only secondary constraints although they have a direct impact on environment. The physical limitations are handicaps to conservation strategies, but these handicaps are only challenges to the desired objective. The fundamental ecological nemesis, in fact, is the existing social and political system which has comatosed government institutions into merely toothless tigers. History witnesses many Machiavellian machinations at the lower political level. The greatest weapon of the authors of such machinations is to fan the flames of parochial sentiment. It is they who have forced forest technicians to compromise large areas of forest land for political and social manoeuvring. Forest areas are often used as safety valves to defuse the pressure for land reforms. This safety approach is misguided, causing staggering percentages of forest to be stripped from the face of our country. Fortunately, by gracious command of His Majesty the King, timber exportation was stopped three years ago. However, it is sad to note that the timber exportation programme is again in process.

2.2 *Land fever*

The land encroachment fever that destroyed the major Terai forest is now spreading like an epidemic disease over the sub-marginal mountain land. It is ironically a “no man’s land” (or in other words, “every man’s land”) because the Forest Department, one of the oldest institutions of His Majesty’s Government, has not yet developed an administrative wing responsible for marking the forest boundaries in the mountains. A gnomic verse says “Great things are done when men and mountains meet.” But here the chemistry of man and mountain is not working well. Because of man, our green mountains are metamorphosing rapidly into something ugly and grotesque. People are in the hopeless grip of a land encroachment fever. They are desperate to extend their land holdings without realising the meagre amount of produce that will be earned after their hard and laborious work. The hungry villagers are understandably preoccupied with their impoverished life, and are consequently oblivious to the cumulative destruction going on around them.

3. THE RESPONSE TO ENVIRONMENTAL DEGRADATION

The alarming rate of forest destruction has stirred and alerted bureaucrats, administrators and policymakers. In 1967 when I joined the Forest Department, my boss preached to me sternly, "Look boy, you must work hard. Our forests are disappearing rapidly and our top soil is washing down to the Indian Ocean to form new islands." Almost two decades have passed since then, but we are still hearing the same old cries. Such ideological conservationist cant has now become hackneyed philosophy.

Recently the Government seems to have become very concerned and has been spending lots of money from loans, which come from the World Bank or ADB, to launch various forest conservation projects. But skeptics feel anxiety: what is the use of spending millions of rupees on plantations when we cannot educate our villagers to refrain from grazing their cattle in plantation areas; what is the use of a greening campaign when we ruthlessly cut thousands of hectares of pristine forest overnight; and what is the use of constructing multi-million dollar dams and other engineering extravaganzas, when we cannot educate villagers to refrain from cutting forest in the catchment areas? Such projects may work as palliatives but fail as restoratives, and to preserve whatever our projects have achieved, we need public participation and co-operation. When I hear the bubbling plans of enthusiastic administrators and their counterparts, it reminds me of the sarcastic conversation between a publisher and a starry-eyed author, "I am sorry but we already have too many books on how to make a million. Do you think you could come up with something about how to make a living?"

3.1 *Pyramid of problems*

At the crossroads of this dilemma, an urgent need for the environmental education of politicians, the public and policymakers is strongly felt. Environmental education transforms politicians into pro-conservationists and helps them to understand the value as well as the cost of our natural heritage. It opens the eyes of the planners, policymakers and administrators to another side of the potential of natural resources, other than that of carrying out textbook patterns of resource exploitation through stereotype development, and it teaches the general public to understand how the whole essence of their life depends on the environment.

It is impossible to accord blanket protection to everything that ought to be protected, but we have to determine our priorities and cut our overall goal into "bite-size pieces". One of the biggest drawbacks to development in our country is the lack of clear priorities. Innumerable problems pile up like a colossal pyramid, and Nepal does not have the needed economic capacity to bulldoze this pyramid rapidly. Finance is always a constraint, but loans and aids are available for removing

this pyramid of problems. The sad irony is that instead of pulling down the pyramid from the top, it is being dismantled haphazardly. When loans and aid are offered we are unable to scrutinise them properly. We use them sometimes either in low priority programmes, or, in programmes which create more problems than they solve. Sometimes we launch such a huge project that it becomes a white elephant as soon as it is handed over to the government. Education is indeed, essential for all planners.

3.2 *Concerted efforts*

When we look at the socio-economic and environmental battlefield, it seems relevant to draw an analogy to a game of soccer. In a crucial match, an individual player cannot control the ball for a long time. The score has to be made through a concerted effort. The ball will be passed skillfully from one player to another. Similarly, one single institution or a project cannot solve an ecological crisis alone; it requires a collaborative inter-disciplinary approach between various agencies. Moreover, education should be a vehicle to arouse awareness of nature and convey the importance of co-operative effort in fighting ecological problems. It should be borne in mind that education is not a panacea for environmental problems; it is a plan for survival. It should be taken as a means for the liberation of the people from the shackles of ignorance and poverty. Education highlights the basic "rule of thumb" of cost/benefit analysis in conservation and development. Human behaviour patterns that are harmful to the environment can be modified through education. It makes hill peoples and planners aware that the mountains provide only a limited life-support system if they are used solely for agriculture (in Nepal, even slopes of 45 degrees are cultivated), but with the preservation of nature they can provide unlimited scope for forestry, agroforestry, horticulture, orchards, poultry, medicinal herbs, and tourism. (This multi-use concept for mountain forest management is dealt with in the proposal for Annapurna Sanctuary, which this author prepared two years ago. It is now in the process of becoming a new "Model National Park").

Paradoxically, in Nepal, due importance has not yet been given to environmental education. Nevertheless, this country has shown a great interest in the overall conservation field. Nepal was one of the first countries to endorse the principles laid down in the World Conservation Strategy. However, at the moment, conservation measures are carried out in a "barbed-wire conservation" manner, or in other words "conservation at gunpoint". This is a temporary measure. The growing conflicts of park and people cannot be resolved for long by forest guards alone; we must educate people and make them feel that it is their own irreplaceable asset and that they have a vested interest in preserving it. This does not mean that we should dispense with all regulatory measures, but it does mean that the "barbed-wire concept" has to be replaced slowly by education.

The World Conservation Strategy states "School curricula should include environmental education, both as an intrinsic part of other subjects and as separate subjects. The government has to incorporate, as a matter of priority, environmental concerns into their national programme at all levels." Conservation education strategy has to consider a wide range of targets, since everyone is a part of the "Man/Environment system", and everyone should know something about it. Within this broad perspective, it is convenient to pursue the following specific approaches, in order to tackle various respective target groups:

- *Formal Education* to be given in the primary, secondary and other higher educational institutions.
- *Semi-formal Education* to be integrated in other allied technical institutions, such as in Engineering, Administrative Staff College, Guide and Scout Training etc.
- *Informal Education* designed for the general public from the tax payer to the bureaucrats and from voters to politicians.
- *Professional Education* for foresters, wildlife biologists and other professionals who are directly involved in the naturalist's field.
- *Education for International Understanding*

The above categories are all equally important and should be launched simultaneously to fulfill conservation objectives. Here, it is very necessary to observe three progressive stages in man's behaviour as it relates to conservation:

- *Level of consciousness and awareness:* Recognition of problems without any attempt to solve them.
- *Attitude development:* Prevents harm as long as there is no direct or indirect cost to himself.
- *Implementation of conservation measures:* The ultimate goal - prepared in heart and mind to care for his environment and to encourage others to do likewise.

The first phase of development is relatively easy and speedily attained through an effective informal education programme, but for the second and third phases we must look to a whole new generation. The education of the next generation is vital. Otherwise, consciousness without aptitude for action is just a hypocritical development. Talking of the next generation may give a pessimistic picture, since it sounds so long and tedious, but it is not exactly so. Back in 1967, when my boss was preaching to me, had he launched a massive educational programme instead of shedding crocodile tears lamenting at the loss of forest, the six-year old children of that time could have grown up into citizens capable of looking after

their environment. It is an irony that ten or fifteen years seems like a long time for an individual, but in the history of a nation it is as ten or fifteen weeks.

In Nepal nearly 80 per cent of the children attend primary schools none of which include environmental education in the curriculum (90 per cent of this figure drop out after primary school, either because of financial constraints, or because there is no secondary school nearby). Most of these children are from poor, backward and relatively disadvantaged sections of society. Ironically they are the ones who live in the regions where environmental degradation is acute and conservation is most urgently needed.

A number of seminars, workshops and numerous cacophonous colloquia have been conducted, by various agencies, on the subject of introducing environmental education into school curricula, but resolutions have been lost in an amorphous heap. A group of NGOs has also launched an active campaign with a task-force, comprising educators and environmentalists, who approach authorities in the Planning Commission, University and the Ministries of Forest and Education. The main objective of the task-force is to collect documentation, to evaluate problems and to prepare a curriculum at least at the Primary School Level. The idea was highly appreciated and supported, only to suffer from procrastination. The task-force is hiding in a jungle of bureaucratic red-tape.

3.3 Custom-tailored programmes

In the field of semi-formal and informal education, some of the NGO's endeavours are quite challenging, unique and action-oriented. Their main target is the teaching profession and their objective is to educate school teachers on the environment so that the multiplier effect through teacher to student will be speedier and more diverse. The group also took a promising and interested body of teachers to a national park and wildlife reserve, helping them to get a feeling and understanding for nature. In order to make teachers self-learning, they organised essay competitions throughout the country, offering attractive prizes to the winners. They also conducted frequent audio-visual programmes for them. The result was positive.

They found teachers teaching children conservation education in an integrated manner. Instead of teaching mathematics in a stereotyped lesson such as "Ram bought fifty mangoes, seven eaten, two lost, how many left?", they found teachers giving mathematics problems with a conservation message such as "Ram takes two minutes to fetch a bucketful of water because his village is near the forest, whereas Kari, who lives in a dry mountain village, takes thirty minutes. How many buckets can Ram and Hari carry in two hours?". Similar examples can be integrated into different subjects.

Another interesting programme of this group of NGOs was to launch a nationwide folk story competition. Each winner was to be announced monthly on Radio Nepal, which has more than 75 per cent coverage in the country. The story was to be simple, witty, humorous, sentimental and religious in order to cater to the illiterate masses. A smart teacher once wrote to me, "In my village, people cut forest unnecessarily. One night, I went to a nearby woodlot and decorated trees with vermilion powder and flowers, symbolising that God dwelt there, and since then no villager has dared to pluck even a leaf." It may sound like religious or emotional blackmail but sometimes it works.

Many national and international environmental and ancillary conservation agencies, having realised that education is a vital component in their projects, spend a fair amount of money and time printing posters, pamphlets and other material bearing slogans in high rhetoric. Stacks of those materials are left unused in dark storerooms. Some of the distributed materials, which cannot be read by the illiterate masses, will be used in villages as wrapping paper for petty groceries and merchandise. If it is colourful and decorative, they may use it to cover their "pigeon hole windows" to stop the wind from blowing in. Programmes are wasted when a quart is put into a pint pot.

Realising the technical drawback, one NGO came up with the idea of organising a poster competition for artists throughout Nepal. It was stipulated that the poster carry an instant visual message on the subject of conservation, but without words. Twenty entries were received; two of these were given to one of the government agencies for printing and they were a success. This illustrates that a custom-tailored approach with a particular target group in mind is a suitable rein for harnessing a wild horse.

3.4 "Not at home"

There are certain principles which have to be adhered to in any educational programme and the first of these is a clear perception of both the purpose and target of a project. Launching a programme without assessing what it means to local people is merely a waste of time and resources. For a glaring example look at educational radio programmes. Originally designed for village education they have now become more or less a playground for big bosses to give speeches and interviews!

Some of the NGOs are quite active and imaginative in carrying out pioneering and yet pragmatic educational programmes. But, as is usual in many Third World countries, where NGO's are generally much weaker than in the developed countries, economic constraints choke them to a premature death. For example, the National Committee of IUCN's Commission on Education, which was formed three years ago, launched many ambitious projects to raise funds locally without any financial aid from government and international agencies, including the Commission's headquarters. The response was extremely good, but since

every project costs money, for field excursions, prizes and awards etc., it eventually became a financial burden to the donors. Finally the time came when a member called on well wishers only to be told "not at home".

Understanding NGOs and how to utilise their knowledge and manpower is also a part of education and should be learned by bureaucrats. NGOs are usually run by educated, genuinely interested and experienced people. They are there, voluntarily, not because of any obligation, but because they are committed to a cause. In the field of nature conservation, public and private, government and NGOs, are simply two faces of the same coin; without one of them, the other is faceless and meaningless. Kenton Miller, Director General of IUCN, said "The balanced membership, consisting of governmental and non-governmental organisations, brings grassroot concerns into contact with the highest level of decision making".

3.5 Grassroot concerns

Since the very vital subject of "grassroot concerns" has come up, it will not be irrelevant or out of place to mention something which this author has been lobbying for on many occasions in education workshops and seminars. Eighty-five per cent of the total landmass in this country lies in the mountains and 92 per cent of the total population in rural areas. Out there, in the mountains and villages, we have environmental problems. We do not need "Dons" here to draw a master plan within the confines of their offices. We need someone to go out there and live in a village and show them what is wrong and how to correct it. One strongly urges that we bring religious leaders, teachers, and local panchas (politicians) to Kathmandu for a month, and organise orientation classes on environmental education. Field trips should be organised to national parks, watershed areas and to erosion-stricken places. They can also be shown what other countries are doing to preserve nature by the use of documentary films. The expenses for such a programme could be negligible. Accommodation can be arranged in inexpensive hotels and a basic food allowance provided. The cost of educating one Ph.D. (approximately \$40,000), would be sufficient to train eight hundred nature-conscious grassroot level leaders who live in the villages, and whose words will have a lot of value and meaning for the villagers. Sending an officer abroad for higher education creates a technical vacuum for two or three years in his office, and when he returns, he brings dreams along together with his diploma or degree that tempt him to stay in Kathmandu either to get rapid promotion or to travel abroad again and again.

3.6 Partnership

Therefore, scholarship funds, whether bilateral or multilateral, should be utilised properly and carefully on a long-term basis, benefiting the country rather than an individual. This is also the kind of education that is required by aid programmers. In this crucial context,

another type of education is greatly needed. This is environmental education for regional and international understanding and co-operation. Ecological problems in Third World countries cannot be neglected, because it is impossible for an economically limited country such as Nepal to handle this colossal ecological problem. The many countries of the Hindu Kush-Himalaya Region, for that matter the whole subcontinent, are governed by one single world of "Nature", which cannot be divided by man-made political boundaries. In the natural world the ecological syndrome is not an isolated event, but a chain reaction that spreads from one nation to another. The disturbances of hill forests in Nepal create havoc in Bengal and Bihar in India, and importation of timber into India encourages deforestation in Nepal (75 per cent of timber harvested from the forests of Nepal goes to India). So an environmental education programme is not only essential at a grassroots administrative and political level, it is also necessary to design it to bring awareness to the various governments of both developed and developing countries.

Ecological understanding and philosophical and common concern must be generated among the people of industrialised countries, so that they develop patterns of production and consumption that will not be harmful to the environment of this planet. Awareness of shared natural resources should be promoted throughout the region; it should be made abundantly clear that the cost of correcting ecological problems should be shared. Mutual co-operation, especially in the field of environment, should be viewed both by donor and recipient countries as a "job-to-do", not charity or aid. The bilateral and multi-lateral aid agencies should continue to integrate ecological and other conservation values and to develop activities

which affect the renewal of resources. If this positive attitude is developed and help is provided to countries such as Nepal, in order to tap its biggest natural resource i.e., hydro-electricity, and is concentrated towards conservation-oriented development, we could save the Himalaya and at the same time save the whole of the subcontinent. Otherwise, even with the best of intentions, if environmental values are not respected the contributions of donors will not be appreciated, and recipients will not benefit.

4. CONCLUSION: A GAME OF CHESS

All of the above problems and approaches are dealt with by citing Nepal as a case study. However, the overall picture is not too different from that of other countries of the Hindu Kush-Himalaya Region. We live in the same mountain world where impenetrable hostile terrain, harsh climate and physically landlocked positions have restricted economic growth and agricultural productivity, paralysed communication and transport, and strangled industrial prosperity. Mineral deposits have not matured here, and other natural resources are pressured into an ecological catastrophe by a rapidly growing population, while the GNP is one of the lowest in the world.

If we put all of these problems in a nutshell, we shall see that the game of conservation in this country is similar to that game called chess, in which opponents can seldom be knocked out in a single assault. Poverty is the rook or castle that crushes in a direct attack; bureaucracy is the knight whose moves are unpredictable; growing population is the bishop which attacks in an oblique manner yet straight and strong; and lack of education is the pawn which moves slowly but plays the most vital role of all.

Environmental Impact of Tourism on Mountain Ecosystems

Sushil Bhattarai

ABSTRACT. *Tourism is an important industry in Nepal and a number of other Himalayan countries, with the primary attraction being the spectacular and unspoiled mountain scenery. But while tourism earns important foreign exchange, it also can lead to environmental degradation which threatens the very attractions which bring tourists to the mountains. This paper outlines some of the problems of tourism and presents a strategy for improved tourism management in the mountain environment, including explicit policies on tourism, alternative energy sources, improved waste disposal, assessment of carrying capacity, expanded research, more appropriate training, improved facilities, and enhanced opportunities for rural people to benefit from tourism.*

1. INTRODUCTION

Tourism is an increasingly important sector of the economy of Nepal. Until the year 1965 the total number of tourists arriving in the country was less than 10,000. During the seventies the figure increased five-fold before leveling off in the eighties. Table 1, presents the distribution of annual total tourist arrivals between the period 1981 and 1984 by purpose of visit. In the past, most tourists came for pleasure and sightseeing. Now there is an increasing trend of trekking and mountaineering tourists every year.

The Himalaya attracts a large number of tourists, not only because of the thrill of climbing some of the highest peaks in the world but because of their sheer majestic natural beauty which is still unaffected by environmental pollution. The Nepal Himalaya has 1,310 peaks exceeding 6,000 meters (Table 2). Nine of the world's 14 highest peaks are in Nepal: Sagarmatha (8,848 m), Kanchanjunga (8,586 m), Lhotse (8,516 m), Makalu (8,463 m), Lhotse Tsar (8,400 m), Cho Oyu (8,201 m), Manaslu (8,153 m), Annapurna (8,091 m) and Dhaulagiri (8,081 m).

The country's altitudinal variation, from 100 meters at the southern plains (Terai) to over 8,000 meters towards the crest of the Himalaya, shows extreme topographical variations with a series of mountain ranges having complex land units and people of great cultural and ethnic diversity.

Table 1. Tourist Arrivals By Purpose Of Visit (1981-1984)

Purpose of Visit	1981	1982	1983	1984
Pleasure or sightseeing	127,709	136,693	132,350	140,592
Trekking & mountaineering	21,668	23,507	24,198	15,010
Business	6,379	7,374	9,801	8,137
Official	5,674	7,166	8,479	9,399
Others	239	709	4,477	3,496
	161,669	175,448	179,405	176,634

Source: Department of Tourism 1985.

Table 2. Number of Peaks By Height Category

Category	Number
A. Eight Thousanders (8,000 meters and above)	17
B. Seven Thousanders (7,000 meters to 7,999 m)	127
C. Six Thousanders (6,000 meters to 6,999 m)	1,166
Total	1,310

The three major river systems – Karnali, Gandaki and Koshi – originating from the Nepal Himalaya form a rich natural resource for hydro-electric power and irrigation. It has been estimated that if all the water resources available in these rivers were utilised, the total energy (electricity) produced would be equal to the energy obtained jointly from all the rivers of North America and Mexico.

Four National Parks – the Sagarmatha National Park (1,243 sq. km) in the Solu Khumbu District, Lang Tang National Park (106 sq. km) in the Mugu district, and Phuksundo National Park (4,144 sq. km) in Dolpo District – play an important role in preserving not only the endangered flora and fauna, but also in protecting the natural environment of the Himalayan region.

2. PROBLEMS OF TOURISM

There is already a pressure on natural resources from local population growth, and the increasing number of tourists in such areas are further compounding the problem. His Majesty, King Birendra Bir Bikram Shah Dev, in his message to the 44th General Assembly of the International Union of Alpinist Associations (UIAA) organised by the Nepal Mountaineering Association (NMA) in Kathmandu in 1982, stated that, "Alpinists, while climbing our mountains, should maintain the sanctity and peace as Nature ordained them".

Similarly, Prof. Michio Yuasa of the Japan Alpine Club, in his message to the above meeting said, "The reason that the Himalaya still attract a large number of tourists is not only because of the thrill of climbing some of the highest peaks of the world but also for its bountiful nature, which is not found in the West any more because of environmental damage." Hence it can be justifiably said that tourists (trekkers and mountaineers) are attracted by the environmental excellence of the region.

Problems of environmental pollution such as leaving behind large quantities of litter, including non-decomposable solid wastes and destruction of natural resources by encouraging local people to cut trees to fuel tourist fires are serious threats causing the degradation of the mountain ecosystem.

The growing numbers of individual trekkers who mostly rely on the local availability of resources are putting extra pressure on the natural environment, as compared to group trekkers and mountaineering expeditions.

The lack of knowledge on the carrying capacity of the area for tourists (especially trekkers and mountaineers) is a major obstacle to keeping the mountain ecosystem in balance. This is even affecting the social, cultural and economic environment of the people living in the mountains.

2.1 Ecological impacts

The increase in population, fragile mountain ecosystems, high altitude of the mountains with steep slopes and rugged topography along with the tourism activities, are all responsible for environmental degradation in Nepalese mountains.

The soaring number of trekkers and mountaineers in the high Himalayas over the last decade has not only created a boom in firewood sales by the local people, but also a dramatic depletion of the natural forest which takes years to regrow. This may even affect the marginal agricultural lands, thereby forcing the people to emigrate.

Wood is the principal fuel throughout the mountains, and everywhere the forests are being cut for firewood and construction; there are few alternatives which would enable people to survive in the mountains. One of the

adverse impacts of tourism (mountaineering and trekking) in Nepal is the increased consumption of firewood in the already deforested hill-mountain regions. In Khumbu region, the present average daily consumption of firewood is 6.4 kg per tourist per day and is increasing by 10 per cent annually (Sharma, 1982). The most common species used for heating and cooking are rhododendron and birch. Other species used are blue pine, juniper, blue fir, hemlock, and so on.

In Khumbu, only organised trekking groups bring their own fuel from Kathmandu but, even they, often support their porters with local firewood. Unorganised trekkers generally stay in hotels or inns that accelerate the use of firewood thereby increasing the deforestation in the neighbouring areas. Hence more pressure on the forest is exerted through tourists as compared to the local people. Mountaineering groups are particularly heavy consumers of wood, especially for making bridges and firewood for cooking and heating at high elevations.

Deforestation is thus the most severe and best known environmental problem contributed to by the mountain tourist. Journalistic accounts have also dramatised soil erosion in the Himalayan region and consequent devastation of adjoining plains and even the creation of a new island in the Bay of Bengal (Gurung, 1982). Laban (1975), estimates 50 per cent of the landslides in Nepal's Himalaya are geologic in nature and the rest are initiated by man, making a major contribution to soil erosion.

Also, the annual rise of river beds in the Terai region by about 15-30 cm through siltation, demonstrates the accelerated soil erosion in the mountains, which if unchecked, may bring ecological collapse and disaster.

The unprotected non-irrigated terraces constitute the most extensively endangered areas; also threatened by erosion are pasture and idle areas, where vegetation cover has been overgrazed.

The Khumbu region, is not favourable for multiple and diversified cropping. Because of the cold climate, crops like potato, wheat and naked barley are generally grown, which may take up to one year to ripen. However, maize, wheat and potato are also grown at lower altitudes. Because of the gradual change in occupation from agriculture to tourism, pressure on land is declining; some lands are even kept fallow for camp sites to be rented to the tourists. The lack of bringing new lands under cultivation may also be due to the strict regulations of Sagarmatha National Park (SNP).

2.2 Socio-economic impacts

Each ethnic group in Nepal developed its own culture in response to nature. Tourism in the Khumbu region, for example, has exposed the Sherpa community to a new value system which creates classes in their society by changing their lifestyle. This may discourage them from

remaining with their family and some may even migrate to cities like Kathmandu for a better living.

Mountain tourism in Nepal, however, cannot be overlooked in consideration of the needs of Nepal's economic development. A large number of Sherpas have been employed in mountaineering and trekking some of them as professional high altitude climber-guides and porters. Mountain tourism contributes around 25 to 35 million rupees per year by way of wages and other services (assuming the total number of employees as 5 to 7 thousand with a per capita earning of Rs. 5,000 per year).

Earnings from trekking and mountaineering accounted for 14 per cent of the gross earnings from tourism in fiscal year (FY) 1980/81 and 19 per cent in FY 1981/82, which is a substantial foreign currency earning source. But, on the other hand, not more than 5 per cent of a tourist's expenditure may filter down to the rural economy.

2.3 *The pollution problem*

Solid waste disposal and sanitation-related problems are compounded as a result of the overcrowding in campsites. The Solukhumbu Trek Route is often referred to as the "garbage trail", and Sagarmatha Base Camp as "the highest garbage dump in the World".

Camp sites which are generally close to the settlement areas are usually public property, so are generally not attended to by the local people and remain neglected. This has resulted in the non-biodegradable materials such as tins, plastics, and bottles left by the trekkers and mountaineers, remaining on the site for a long time.

In the higher regions, the excrement of animals and man is generally used to manure the fields. But due to the increased number of trekkers and mountaineers the campsites generally have insufficient litter pits and the trekkers, mountaineers and their support personnel, may use open places and pollute river water. This can result in various parasitic diseases in the local people and in other tourists, thus producing a serious health hazard.

3. STRATEGY FOR MANAGEMENT

3.1 *The present conservation approach*

Various efforts have been made by His Majesty's Government to conserve and protect the mountain environment, such as the opening of national parks and wildlife reserves, watershed management projects, integrated rural development projects, etc. The Environmental Impact Study Project of His Majesty's Government is carrying out impact studies of various environmental development activities.

The Forest Act, the National Parks and Wildlife Preservation Act, the Soil Conservation and Watershed Management Act, the Tourism Act and the Mountaineering

Expedition Regulations are important steps in minimising ecological damage in the mountains.

The National Park and Wildlife Conservation Act (1972), not only protects the endangered flora and fauna but prohibits cutting of grass and timber, fuelwood collection, medical herb collection, hunting and capture of any animal or bird, any kind of settlement or agricultural activities, burning and damaging of any kind of natural resources, etc. in areas established as national parks.

The Mountaineering Expedition Regulations 1977, of the Tourism Act 1978, provides for maintaining a clean environment. The same Act has also provision to punish breaches of the above Act, by prohibiting the party to enter Nepal for 5 years or undertaking any mountaineering expedition for 10 years.

The Mountaineering Expedition Regulation 1979, has various provisions to protect the environment, including protection of culture and religion, protection of nature and natural resources, and maintenance of clean environment through disposal of garbage, etc.

But in practise, keeping the environment clean is getting difficult. It may be due to the lack of a proper agency of the government to monitor and follow up the regulations, or lack of sufficient alternatives for fuelwood, or lack of education and awareness among Sherpa porters who accompany the groups.

The Sagarmatha National Park (SNP) was established in 1975, in order to conserve forests, wildlife and the landscape of that region. Before the enactment of the Forest Nationalisation Act of 1957, protection and management of the forest and pasture lands were done by the Sherpa community by appointing protectors "Shing-i-nawa", from each village who were paid by the community. After the Nationalisation Act, government ownership however could not effectively protect the forest. An increase in population was accompanied by increasing numbers of cattle; forest areas in the vicinity of the villages were cleared for agriculture and other accessible forest areas were also over used. The increasing tourist flow during the sixties, eased the pressure on land, but the pressure on forest for firewood and timber accelerated.

The opening of SNP was a timely step to protect the deteriorating environment of this region. Strict rules and regulations were imposed for the use of natural resources. People started using smokeless ovens which require much less wood than the traditional ones. The SNP managed Jorsalle Kerosene Depot on a trial basis, but it is not functioning well as yet. The increasing number of tourists who remain in local inns also forced local people to collect more firewood, often violating the regulations set by the SNP. The lodges operated by the SNP at Thangboche, Feriche and Lobuche do not have firewood problems, as compared to the local inns, and this has created some misunderstandings between the SNP staff and the local people.

Though the trek routes inside the Park area are fairly clean, the camp sites are still polluted with undecomposable wastes like tin cans, plastic bags, bottles and film containers. Such waste disposal also pollutes water in the nearby streams. However, cleaning of garbage and rubbish has been started slowly through volunteer efforts on the trail to Sagarmatha.

The authority to issue mountaineering permits through the Nepal Mountaineering Association (NMA) is another step in involving non-governmental organisations to promote mountain tourism through proper protection of the environment.

The existing hydro-plant in Namche Bazar is too small even to meet the demand for lighting. The need for alternatives to fuelwood is being felt now by the local people. Bio-gas production and composting plants are being planned, but need more technical skill since the climate is too cold for gas production under ordinary conditions.

3.2 Future management

For promoting mountain tourism, with due protection of the environment, the following recommendations for future management are presented:

1. Firm policies are needed on land-use planning in the mountains, with clearly defined zones.
2. While also seeking other alternate energy sources, use of efficient stoves should be promoted in order to reduce the firewood consumption.
3. Proper management of waste disposal and the enforcement of the existing rules and regulations could be more effective. Also, pollution control awareness on the part of the Sherpa porters is essential, since they are generally given charge of waste disposal by trekkers and mountaineers.
4. In order to avoid pressure on mountain ecosystems, expeditions and trekking permits should be given on the basis of the carrying capacity of the area. Opening of new areas can also complement the need.
5. Proper attention should be given to enforcing the various acts and regulations related to the protection of the mountain environment. Similarly, national policy should encourage mountain tourism in harmony with environmental protection.
6. The King Mahendra Nature Trust for Conservation should help to mobilise non-governmental organisations (NGOs) to undertake various activities especially environ-

mental education and research, in order to promote and protect the mountain environment.

7. Management of mountain ecosystems needs sufficient research. The interrelationship between the people, resources, environment and development is very important in countries like Nepal where the mountainous region occupies two-thirds of its total area. I feel it appropriate to mention here the necessity of a joint effort between the International Centre for Integrated Mountain Development (ICIMOD), the United Nations Environment Programme (UNEP) and the concerned HMG agencies to carry out a detailed case study, in order to have an integrated approach for sustained development in the Hindu Kush-Himalaya region. This joint effort can also conduct research on:

- methods of rehabilitation of high altitude forest areas;
- preparation of ecological maps; and
- appropriate technology for alternate energy sources.

8. The Manang Mountaineering School and the proposed International Mountaineering Museum at Pokhara are timely efforts to promote mountaineering and effective environmental education. Hence these efforts also need proper support from all national and international levels.

9. In order to handle the increasing number of mountaineering and trekking tourists, trails and campsites need better facilities and alternatives to improve the hygiene and sanitation.

10. People living in mountainous regions should be encouraged to produce vegetables, fruits, poultry, dairy products and handicrafts by providing them soft financial loans, expertise and marketing facilities. This may divert people from traditional agriculture which will ultimately help to reduce pressure on forestland.

4. CONCLUSIONS

Mountain tourism should not only be limited to mountain climbing and sightseeing but should also include the protection and promotion of the natural environment and cultural heritage. If there were no resources there would be no tourists and so, no economic returns. Mountaineers and trekking tourists need more resources than the local people. There should be a trade-off between environmental damage and financial return, while promoting tourism in the mountains. National policy should therefore encourage mountain tourism in harmony with environmental protection.